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HOW ASSOCIATIONS HELP CONDITIONS.

Two important organizations will hold their annual meetings next week. The American Society of Heating and Ventilating Engineers, organized in 1894, holds its sixteenth annual meeting in New York, January 18-20, and the American Society of Inspectors of Plumbing and Sanitary Engineers holds its fifth annual meeting in Trenton, N. J., January 20-22.

Both these organizations have performed marked service in their respective fields, and their future efforts should receive the support of those who are eligible for membership; for, while these two scientific societies place through the trade journals the papers which are read at their meetings unreservedly at the service of those who are not members, the members who are sufficiently interested to attend secure the immeasurably greater advantage of hearing the discussions which cannot be published, and, later, of receiving the bound proceedings of the societies, which form valuable accessions to a working library.

A brief word of appreciation of the work of these two organizations may not be amiss.

The American Society of Heating and Ventilating Engineers is now fifteen years old, and has enrolled about four hundred of the leading heating and ventilating engineers of the United States, Canada and Europe in its membership. Through this gathering, together of men with common aims and interests, it has secured a greater degree of recognition of the heating engineer's profession by owners of buildings, architects, contractors and others. In conjunction with the American Institute of Architects it has secured the retention of competent heating and ventilating engineers for designing this class of work, and has arranged the adoption of a standard minimum scale of charges for such work. The society has secured the adoption of a uniform contract and specification, the use of which secures a clearer understanding between the owner and heating contractor and prevents many disagreements and resultant expensive litigation. One of the chief services the society has rendered—and this is to all the people—is the enaction by the states of New York, New Jersey and Pennsylvania of laws requiring the proper heating and ventilating of schools and public buildings. In other states the society has created much sentiment in favor of such laws, so that their final enactment seems more certain. In addition to the beneficial results of the society's work outlined above, it is a pleasure to call especial attention to the meetings which have been held twice a year, at which many valuable papers have been read and interesting discussions heard. The literature of the heating business has been much enriched, its practice has been greatly improved and standards of work have been greatly elevated. This free and unrestricted dissemination of knowledge is the greatest testimonial to the society's usefulness. Accompany-

ing this is the incalculable good derived through personal contact between the attendants at the meetings, where friendly connections are formed which are never-ending in their helpfulness.

While the American Society of Inspectors of Plumbing and Sanitary Engineers is not so old, it is possible to say much of good concerning it. That from twenty-five attendants at its first meeting it has grown to over one hundred and fifty members is a sufficient indication that a need exists for such an organization. The regulation of plumbing by proper ordinances is one of the most important functions of municipalities, and yet there is no weaker manifestation of that administration than is to be found in the inconsistent and unsuitable plumbing ordinances existing in many cities. Rapidly the society is rectifying these errors by providing standards for plumbing design and practice. The society's work is adding dignity to the office of the plumbing inspector, which, in too many cases, has been quite wanting. Its papers and discussions have done much to bring about a more uniform practice among sanitary engineers. As an instance of the great gains effected by its work, the seal of condemnation set upon the insanitary and indecent latrine or trough closet may be cited. Its endorsement and advocacy of the public comfort station has been helpful in creating the public sentiment in its favor which is now bearing fruit in so many cities. But above all these improvements which are being brought about through the influence of the society, perhaps its greatest work is in aiding in the standardization of plumbing material and fixtures. This is greatly needed and its importance cannot be overestimated.

Such, in brief terms, is a description of some of the unselfish work being performed by these two societies; they are deserving of the widest possible support from all who desire to continue the improvements begun in the important fields of heating and plumbing.

JNO. K. ALLEN.

PEN JOTTINGS.

Don't you hear the hum of New-Year business?

Eligible plumbers have two years more of grace. It is not leap year till 1912.

No need to buy a new grip to go to the plumbers' or heaters' conventions. An old grip in the hand of a live man will be checked more gladly than a new grip in the hand of a dead one.

All conventioners loaded with a grouch will be tagged upon discovery with a special card inscribed—Herausmittem.

We will be glad to receive impressions from our readers concerning the industry in their localities. A line or two now and then is appreciated by the dullest editor. Don't be afraid to cut loose.

ENDORSES OUR EDITORIAL ON ANTI-SIPHON TRAPS.

Editor "Domestic Engineering": Acknowledging as every one does that anti-siphon traps do not lose their seals in actual practice, they certainly are a safeguard to keep back the offensivce sewer-gas and should be used under every fixture. Back-venting could be added also as an additional precaution where the expense would be permissible, for it tends to keep the seal-water from contamination, which when the traps are not in use, might become saturated, thus giving off some odor. But primarily the anti-siphon trap should be the only style trap allowed if we are to improve and better the plumbing system. Yours very truly,

Cleveland, O. The Ohio Brass & Iron Mfg. Co.
F. A. Radcliffe, President.

CONVENTION DATES.

Jan. 18 and 19, 1910.—Annual convention of the Master Plumber's Association of Wisconsin, at Sheboygan, Wis. President, Jacob Schuh, 1120½ Cliet St., Milwaukee, Wis.; secretary, I. Toussaint, 1705 Walnut St., Milwaukee, Wis.

Jan. 18, 19 and 20, 1910.—Sixteenth annual meeting of the American Society of Heating and Ventilating Engineers, in New York City. The sessions will be held in Engineering Societies building, 29 West 39th street. Secretary, Wm. M. Mackay, 113 Beekman St., New York City.

Jan. 18, 19 and 20, 1910.—Annual convention of the Iowa Master Plumbers' Association, at Cedar Rapids, Ia. Headquarters at the Montrose Hotel. The officers of the association are: President, J. F. Garvey, Mason City; vice-president, C. G. Bosch, Burlington; treasurer, J. F. Gearen, Sioux City; secretary, Wm. J. Nesler, Dubuque; organizing secretary, W. A. Bruce, Des Moines.

Jan. 20, 21, and 22, 1910.—Fifth annual meeting of the American Society of Inspectors of Plumbing and Sanitary Engineers, at Trenton, N. J. Officers: President, Chas. B. Ball, chief sanitary inspector, Department of Health, Chicago; secretary-treasurer, Charles S. McCosker, Mobile, Ala.; vice-president, A. C. Shaver, Pasadena, Cal., and F. W. O'Neil, Joliet, Ill.

Jan. 26 and 27, 1910.—Annual convention of the Illinois Master Plumbers' Association, at Springfield, Ill. Headquarters at the Annex of the St. Nicholas Hotel. President, W. J. Lang, 538 E. Division St., Chicago; secretary, W. C. Haviland, Coulter block, Aurora, Ill.

Feb. 15 and 16, 1910.—Nineteenth annual convention of the Ohio State Association of Master Plumbers, at Youngstown, Ohio. The sessions will be held at Knights of Columbus Hall and headquarters will be established at the Tod House. President, J. L. Riley, 157 McDonough St., Dayton, Ohio; secretary-treasurer, Eb Ellen, 4714 Central Ave., S. E., Cleveland, Ohio.

Mar. 7 and 8, 1910.—Annual convention of the Kansas State Association of Master Plumbers, at Kansas City, Kans. Headquarters at the Grund Hotel. E. D. Draper, 730 Minn. Ave., Kansas City, Kans., secretary.

Mar. 8 and 9, 1910.—Annual convention of the New York State Association of Master Plumbers, in New York City.

April 11, 1910.—The annual meeting of the Association of Master Plumbers of the State of Arkansas, at Fort Smith, Ark. Headquarters at the Hotel Goldman. Secretary W. H. Bruce, Fort Smith, Ark.

Heat: Its Use and Distribution*

(Continued from Page 34, January 8, 1910.)

The absolute zero which all matter reaches when heat is absent may be used as a base from which to calculate heat potential, as the center of the earth is used as a base in gravity calculations. The temperature of any body on the absolute scale is momentarily its index of heat or potential. To illustrate: A pound of water at 60 deg. F. would equal 519 deg. on the absolute scale, and its work equivalent above absolute zero is 519 multiplied by 778 ft. lb. A pound of iron at the same temperature would have the same work value divided by the ratio of its specific heat to that of water, which is about 9. In like manner, any mass's absolute work equivalent may be determined. Between two objects of the same temperature, no heat passes; therefore, no work is done. It is only by raising the heat of one above the other that work may be done. All commercial work, therefore, resolves itself into the transference of heat from a high potential to a low potential body.

In passing to the discussion of the use of heat, we have seen that all energy in its final analysis is the work done in the equalization of temperature between different bodies, and it is necessary in order to use it commercially to have this equalization take place in such manner that it can be readily utilized.

The evaporation of water by the sun's rays, and its subsequent precipitation in the form of rain or snow, which, in turn, is stored in the earth and gradually conveyed by rivers to the ocean, constitutes an energy cycle which continues ceaselessly. The portion of this cycle which deposits rain or snow renders possible the growth of vegetation which through long processes of the ages has been transformed into coal, natural gas, oil, etc. All of these substances possess given heat values which, through certain well-known processes, man converts into available heat of higher potential.

The vegetation nourished by rainfall helps the rain to filter into the soil and be given out gradually in springs and rivers. The unevaporated portion of this water finally reaches the sea, where it is again evaporated and put through the same cycle. The process of evaporation, being a continuous one, has piled up enormous quantities of stored heat equivalent in the form of coal, oil, gas and forests, all of which may be considered as by-products of the great evaporation cycle in which our water powers are by far the largest exponents. The amount of the sun's energy thus stored is estimated as only about 1-1000 of that delivered to the earth.

The fact that the earth is not at all points of an even surface causes the water that is deposited to seek the point nearest the center of the earth, acting in this way as an agent of the law of gravity. Water in traveling from a higher elevation to a lower can be made to give up a heat equivalent or work value proportional to its mass and fall. The total aggregate of such power reaches may million horse-power and is continuously available. The non-utilization of this heat equivalent is a great economic waste which we have scarcely begun to remedy.

Coal, oil and gas have been heavily drawn upon for fuel purposes, and the supply is rapidly diminishing without a chance of their being renewed. The forests have also been greatly depleted for fuel and other purposes, and unless the destruction ceases our water powers will be greatly impaired and their availability for fuel or heat correspondingly injured. The artificial storage of the direct heat of the sun has not been satisfactorily accomplished, and until this problem is solved we must depend on water power and other means before mentioned to furnish our commercial heat and energy.

The animal kingdom outside of man has no knowledge of the use of fire or other forms of heat, and this knowledge is one of the greatest factors in marking the barrier between certain animal species and the lower orders of man. In other words, our expertness in the use of fire or other forms of heat is in a great degree the measure of our advancement in the animal kingdom. In our daily lives, artificial heat in some form or its mechanical equivalent is at the foundation of nearly all our conveniences and activities. The ancient Greeks made the snatching of fire from the gods the distinguishing event in the development of man, realizing that without heat in its various forms we should not have risen above the level of the beasts. The words, "heat, energy and power," are used synonymously in this discussion as they are interchangeable terms.

The heat demands of our present civilization are so enormous that we can already look forward to the time when the stores of coal, oil, gas, etc., will be so depleted that other methods of deriving artificial heat or energy must be found. No doubt the pressure of necessity will solve the problem as they are presented.

The value as a heat producer of any of the present agents at our command is measured by its B. t. u. value. In deriving heat or energy from original storage elements the mechanical equivalent of heat is the end usually sought, but the cycle is never complete until this mechanical equivalent has been again resolved into its primary state—heat. The use of any particular storage unit from which to obtain its equivalent in direct heat or mechanical equivalent is generally determined by its cost and availability. A further modification is introduced by the sub-agent employed in distributing the heat units or energy made available. It is the purpose of this treatise to define broadly, the best methods of economically using and distributing the various heat storage elements placed at our command.

The principal sub-agents employed in direct and indirect heat applications are air, water, steam, gas and electricity. These sub-agents are the conveyors of high potential heat to places where the heat equalization or work equivalent is used.

Direct heat application may be considered to embrace the heating of buildings, furnaces, cooking utensils, etc., while indirect heating includes these and the various mechanical and chemical equivalents used in commercial life.

The development and utilization of water power as a means of performing useful work dates back many hundreds of years, but the development was insignificant until the discovery of a suitable distributing agent. Broadly speaking, the heat units represented by the energy of a water power are contsant, and the final dissipation into various forms of mechanical equivalents are misleading

* Read before the Association of Engineering Societies, May 10, 1909, by Lyman C. Reed, Member Louisiana Engineering Society, and reproduced by courtesy of the Journal of that Association.

only in so far as we fail to realize the final values of the transformation.

Early users of water powers were confined to running small mills principally for grinding grain and sawing lumber. Later, mills and factories located on the banks of streams where water power was available obtained their power through water wheels and, through the agency of shafting and belting, were made to perform mechanical work on a large scale. It was not until the advent of electricity as a distributing agent that water power could be used economically at a distance from its site, either as a direct heating agent or in some form of mechanical equivalent.

In transforming the energy of a water power into electric power a certain percentage of the original power is not transformed in the manner desired but is given off in heat in various ways. The friction of the water in the penstock and wheel, the friction of the bearings supporting the wheel, and the various losses in the generator itself, all manifest themselves in the form of heat which is given off to the surrounding objects and dissipated.

The conversion of the electricity generated into mechanical or heating and lighting effort shows another loss varying with the degree of efficiency of the translating units. The total amount of heat equivalent generated is finally diffused and equalized at atmospheric or surrounding temperature or stored in some latent form for further transformation. The process of analyzing the complex quantities involved in each transformation is beyond the intent of this discussion, but it is desirable to keep in view the conception of heat equalization as broadly outlined. The economy of heat distribution by means of various sub-agents ranks among the absorbing economies of our race and is kaleidoscopic in viewpoint.

Nature's most generous gift to man is water power, and its preservation and utilization are among our chief concerns. In order to preserve the water power, the forest must be preserved, which in turn contributes to our coal supply. Thus we see that the great original energy storage agent are so interlinked as to be inseparable; their intelligent use must appeal to us as a duty.

In utilizing the water power as a distributer of heat it is found that electricity offers the most efficient subagent. As much as 70 to 75 per cent of the energy of the water power is thus made available for a distribution whose efficient radius is being constantly enlarged. The development of long-distance transmission has been rapid, and systems are now in use where the power is used four to five miles from the site of the water power.

In order to make this transmission of power a success a market must be found or one created for the sale of applied heat in its various forms. Among the largest users of applied heat is the city, as the number of heat units used per capita is much larger than in rural districts. The demand for light, transportation, heating and factory operation represents a greater unit activity in cities than in rural districts and, in fact, the capital investment is so great to reach a widely scattered rural district that it seldom pays to distribute heat units from a central source. This condition is modified where a central supply system traverses a rural territory to reach a market further on. Latent storage agents such as coal, wood and oil are used to furnish individual heating needs both in city and country where the cost of obtaining heat units from a central supply system is prohibitive. This statement is misleading on analysis because in any instances the additional load of this class of heat users would make a central distributing system commercially profitable by reducing the fixed cost per unit.

While the energies of water powers are almost universally distributed by means of electricity, some of them, as has already been cited, are transformed directly into mechanical effort. The final dissipation of this mechanical energy manifests itself in the form of heat or its latent equivalent. Even where extended distributing systems are not contemplated, it is frequently found that power distribution is more cheaply accomplished by electrical than mechanical means. This applies especially to large factories and industrial plants scattered over large areas. In plants where the absorption of energy is purely mechanical, its entire equivalent is dissipated in heat, but in many instances a certain proportion of the energy is stored in the form of latent energy. In the manufacture of calcium carbide and other chemicals a portion of the energy used in their production is stored and held in suspense until released at man's option. The generation of acetylene gas from calcium carbide and water makes a gas that is suitable as a direct heating agent and when ignited completes the cycle started at the water power. The storage battery may be taken as another example of latent heat or energy accumulator where the final dissipation of the original heat value of the current stored is held in suspense until the battery is discharged and the current reconverted into direct heat or its mechanical equivalent.

In transforming a water power into electricity only a portion of the available power is liberated in heat at the time of transformation, but in the transformation of wood, coal, gas or oil into electricity, the present process is to liberate the entire available heat units by combustion and then absorb as many of them as possible in some sub-agent for distribution. This process takes place in our present boilers where the water is used as a link in the cycle of transformation. The average loss in this first transition between the heat released by combustion and that absorbed by the water in the boiler is about 40 per cent of the original heat value of the fuel. This 40 per cent is spoken of as lost because it is not available for useful work. The remaining available 60 per cent may be distributed for primary heating purposes either as hot water or steam. The convection principle is employed in the use of hot water or steam as heat distributors, but the local application in heating buildings or groups of buildings is accomplished by radiation and convection. Cooking and washing are also among uses these sub-agents fill, but are seldom available from a central distributing system. Owing to their limited availability hot water and steam are not widely used as heat distributors for other than primary uses, such as direct heating and driving steam engines.

It has been shown previously that the efficiency of a water power was as high as 75 per cent, and it has just been shown that the efficiency of an ordinary boiler is about 60 per cent, demonstrating that for direct heating purposes the water power is the most efficient, but owing to cost of development may not be the best to use commercially.

(To be continued)

F. T. Baker, San Pedro, Cal., has secured the contract for the plumbing in the new three-story Elks' building, which is now being erected in that city. The consideration is $1,570. The plans for this building were made by Architects Hudson & Munsell, Stimm building, Los Angeles, Cal.

Kitchens and Laundries

Their Planning, Arrangement, Equipment and Sanitation.

By Wm. Paul Gerhard, C. E.

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CHAPTER III.—KITCHEN RANGES.

Details of Kitchen Ranges.—The numerous varieties of cooking ranges may be divided into two classes, namely portable and permanently set ranges. The latter may be again sub-divided into open-set (Figs. 3, 4, 5, 7, 8, 9, 10), and brick-set (Fig. 7) ranges. Sometimes we find ranges classified according to the number of round holes in the top plate.

Of portable ranges, the simplest example is the ordinary family cooking stove for wood or coal fuel. In houses of smaller towns and in country cottages, permanently fixed ranges are not usually provided, and it devolves upon the tenants to buy and fit up a portable range. But in the more expensive houses, and in apartments as well as dwellings of the larger cities, the kitchen range is always found to be permanently installed, whether the house is for sale or for rent.

The size of a range should bear a proportion to the size of the house or to the number of people for whom meals are to be cooked. The smaller houses have four and four and one-half foot ranges (See Figs. 3 and 8), the larger ones five and five and one-half foot ranges (See Figs. 4, 5, 6, 7, 9 and 10); in mansions ranges up to six and even eight feet in length are installed, or sometimes two ranges are set side by side.

According to its size, a range has either one or two fires, one or two ovens, single or double warming shelves; sometimes a broiler with a charcoal fire is added. There should always be a hood over the range.

In modern houses we often find two ranges set up, one for coal and the other for gaseous fuel; combination gas and coal ranges are also obtainable (See Figs. 8, 9 and 10). Even small houses have a gas range of small size intended for summer use. We now-a-days have not only coal ranges with gas cooking attachments, but also gas ranges equipped with a wood or coal fire cooking attachment. The latter device is particularly desirable in a kitchen where it is the practice to burn up waste paper, litter or kitchen refuse, for this cannot be done in a gas range.

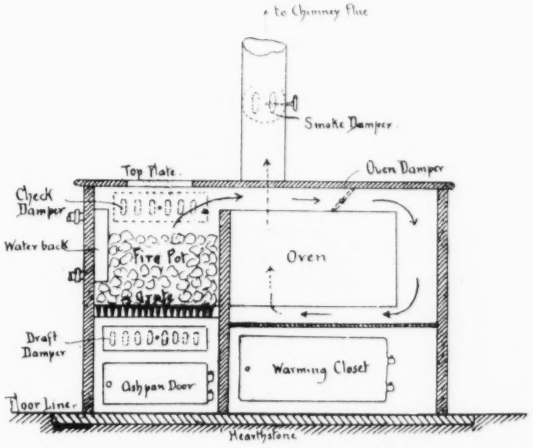


Fig. 1. Sectional View of Coal Range and Position of Damper.

For many years it was quite customary, in the better class of dwellings, to build the ranges in between brick jambs, but more recently the open set ranges, built flat against the chimney-breast, are preferred.

The hot-water boiler, if placed in the kitchen, is always set close to the range, either vertically or horizontally

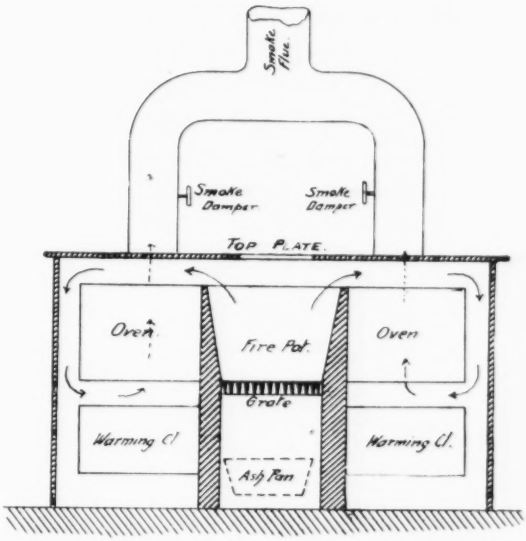


Fig. 2. Sectional View of French Range with Double Oven.

(See Fig. 8); sometimes, as already mentioned in Chapter I, it is set in an adjoining closet to avoid heating the kitchen by radiation. In recently built houses the kitchen boiler is done away with and instead of it a central hot-water tank is provided in the cellar, which requires a special fire or else steam coils placed in the tank. The modern apartment house kitchen is heated by means of steam radiators; there is no coal fire and no hot water boiler, hot water being supplied from a central source in the cellar.

The details of the construction of kitchen ranges vary according to custom or habit, and according to the fuel used, and many different shapes and forms are on the market.

In the construction of the range we find the top plate made of heat-conducting material, while all other sides are made non-conducting. The top plate is supported at the ends and, if very long, it has intermediate supports. Provision should always be made for expansion of the top plate to guard against its cracking. This horizontal top plate is made either in one piece or else it consists of several smaller plates. In both cases these are arranged for the convection of heat. The larger the plates, if of cast iron, the more easily they crack; such cracks are objectionable because they permit cold air to enter, which cools and thereby spoils the fire. Large cast iron plates are very costly to repair. A top plate, consisting of too many small pieces, is likewise objectionable because of the numerous joints which may leak air. The

best size would seem to be from five to seven and one-half square feet, with a width of the plates of from two to two and one-half feet.

The smoke damper, the checks and the draft damper are among the most essential details of any range. Their object and their manipulation should be studied very

Fig. 3. Richardson & Boynton's "Perfect" Open-set Coal Range.

carefully in order to properly manage a range fire. (See Figs. 1 and 2.)

The smoke damper is a flat, disc-like device inserted in the smoke flue to close or open the same, for the purpose of controlling the draft. A damper should never close the flue entirely, in order that there may always be some escape of gases into the chimney. Opening the damper causes a rapid combustion of the fuel, and much of the heat is lost into the flue. It should therefore be opened only sufficiently long to get the fire well started.

The draft damper is a slide located in the ash door below the fire grate. When the draft damper is kept open, the fire burns more briskly, owing to the larger volume of air admitted under and through the fire.

The check damper is a slide placed in the front door above the fire box. Opening this check damper causes a current of cold air to pass over the fire which checks and retards combustion, and reduces the heat both of the top plate and of the oven.

Accordingly, if a brisk fire is wanted, the check damper is closed and the draft damper opened; for a moderate fire the damper is partially closed; opening the check damper partly reduces the heat of the fire, and closing the draft fully and opening the check wide causes the fire to burn very low.

All dampers should be conveniently arranged to permit of a perfect control of the fire.

The fire gases are made to circulate under the top plate from the fire box through special flues (See Fig. 1), so that the entire top surface becomes heated and thus available for cooking. A special sliding damper controls the oven, and by its use the heat is made to circulate over and under the oven. The cooking pots are either set into the opening and heated by the direct exposure to the fire underneath, or else cooking vessels are set on top of the hot plate. Some manufacturers make ranges with from six to eight holes in the top plate (See Figs. 3, 4, 5), others make a specialty of ranges with only one hole (Figs. 6 and 10), which is then placed directly over the grate fire; some ranges have two or three holes; a few makers manufacture ranges without any holes in the top plate and claim that these are the best. Many experienced housekeepers consider the ranges with a single hole, with several concentric rings of varying diameter, to be preferable. I believe it is a fact that French cooks or "chefs" have been known to refuse to cook on any other kind of range.

Kitchen ranges vary in length, as has already been stated, and where combination ranges are used, the coal range is from four to five feet long and the gas range from one and one-half to two feet long (Figs. 9 and 10). The usual depth of a range is from two to two and one-half feet.

The fire pot in the range is always lined with fire brick in order to retain the heat better and also to prevent the cast iron from becoming red hot and cracking. The fire pot should be provided with a self-shaking grate, by which is meant one that will permit the easy dumping or dropping of clinkers and ashes. It is essential that its construction and mode of operation be well understood.

Regarding the ovens in a range, the so-called "elevated ovens," which were formerly much used, are now out of date, at least for coal ranges; they are, however, used for gas ranges (Figs. 8 and 9). According to the length of the range the ovens are made of various sizes. For the roasting of meat they should be heated from the top downwards, as this secures a more uniform roasting, but pastry and bread demand more heat at the bottom and therefore baking ovens should be heated so as to conform to this requirement. Ovens should be well ventilated by bringing in pure air and removing the odors

Fig. 4. Richardson & Boynton's "Perfect" Open-set or Portable Range.

into a flue; baked bread and roasted meat are thereby rendered more palatable. The oven is now-a-days always heated from the general fire in the range, so that no other special fire is required. Broiling is done in front, over or under the fire; some ranges have special broiling doors in front, others have special charcoal broilers, requiring a separate fire (Fig. 6) and flue.

A good range always has provisions for warming closets and warming shelves. The ash pit should be provided with a dust flue to carry off the dust produced by shaking or dumping the grate.

The water back is placed in the fire pot and is made of either cast iron or of brass, wrought iron or copper. It is made either in box shape or else in coil shape.

In very long ranges, provision is sometimes made for excluding parts of the top plate from the fire, or else the ranges have two fire pots.

Regarding the consumption of fuel of ranges, it is found that ten square feet of top plate require on an average from nine to twelve pounds of coal per hour.

In setting a range, a fireproof foundation under it is essential, also a hearth in front of the range for the falling hot ashes or pieces of hot coal. (Fig. 1.) The range should always be set so as to command a good light in daytime. Ranges are set with either two, three or all sides free. In institutions, it is customary to set the ranges entirely free and sometimes two ranges are set back to back to each other in the middle of the kitchen.

The outer walls of a range consist of polished or blackened iron; sometimes a marble or tile enclosure is provided, which makes a durable and cleanly arrangement. The so-called "French" ranges have the whole body of heavy wrought iron firmly bolted and riveted together and made so tight that no cold air can penetrate. In these the top plate is made of heavy cast iron. The fittings of the range, such as doors, etc., consist of iron or of brass. The fire and ash doors have usually a vertical axis, and the oven doors usually a horizontal axis (Fig. 6), but where their axis is vertical a drop shelf is provided. Oven doors are sometimes worked by pedal action. The flues in a range are so built as to compel the fire gases to take a downward direction in order to thoroughly heat the top plate and the oven; if they were

Fig. 5. Richardson & Boynton's French "Perfect" Range.

arranged to run straight, too much heat would escape unutilized into the chimney. (See Figs. 1 and 2.)

Chimney Flues.—Flues are one of the important details of house construction and the kitchen flue, which is intended to remove smoke and gases from the range fire is, perhaps, the most important flue in the house.

If flues are not properly built and do not draw well and consequently smoke, the house is very apt to be considered by the owner a "failure."

The kitchen range should always have an entirely separate flue. Chimney flues are best if built of hard-burnt bricks, with walls eight inches thick, and as far as possible carried straight all the way to the roof.

It is a good plant to line the inside of flues with continuous clay or terra-cotta pipe with sections fitted together with cemented joints, struck smooth. If a flue is

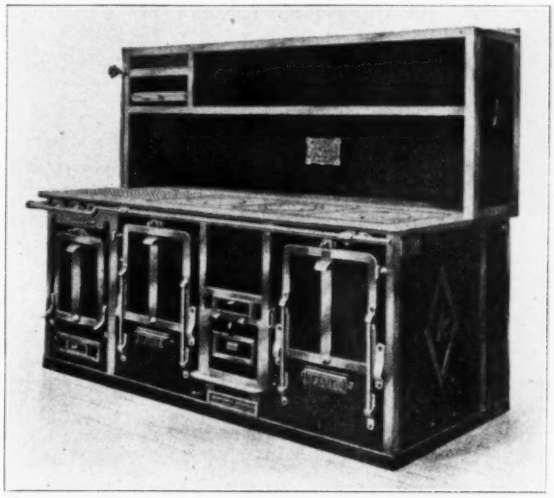


Fig. 6. Bramhall, Deane Co.'s French Brick-set Range with Broiler.

not lined its joints sould be filled solid with cement mortar. All rough projections should be carefully avoided, for they accumulate soot. The chimney should rest on a good foundation, such as brick piers.

In section flues are built either square or round, the latter form being the best. They are made either 8″x8″ or 8″x12″ in size. Oblong flues (as for instance 4″x12″ or 4″x16″) are not to be recommended. Square flues can be changed into round ones by lining them with vitrified chimney tiles or with cast iron flue sections.

The opening where the range smoke pipe enters the flue varies from 7 to 9 inches; before making this connection the flue should be thoroughly cleaned.

The smoke pipe should fit close into the flue opening so that there will be no chance for air to enter the flue around the smoke pipe as this spoils the draft.

At the top the flue is often finished with a capstone or with tile pipe, and it is a good plan to extend the flue at least 3 feet higher than adjacent roofs. The chimney breast should not be less than 5 feet wide.

An experienced architect, M. T. Clark, of Boston, states that chimney flues should not be contracted near the top, except when they are unnecessarily large below.

Tapering sides at the top of a chimney deflect the horizontal currents of wind and assist the action of the chimney in discharging smoke and gases.

The chief trouble experienced with chimney flues is that of an insufficient or defective draught. This may be due to various causes:

(a) The flue may be built too small or be otherwise wrongly constructed; (b) the flue may be partly obstructed or choked by fallen brick; (c) the flue may be exposed to down-drafts by reason of eddies caused by adjoining buildings, roofs, hills or trees; (d) there may be a leakage of cold air into the flue which reduces or spoils the chimney draft; (e) there may be cracks in the oven, or a cracked range top, a broken cover, an open joint in the smoke pipe admits air or the ashpit door in

cellar may not close tight. The smoke pipe should always be tightly fitted into the chimney flue, for any cold air entering and mixing with the fire gases reduces their temperature and hence tends to spoil the chimney draft. If there are any other openings into the kitchen chimney below the range, they should be tightly closed by a good stopper, one that is not apt to corrode or become pitted with rust holes.

(f) When the chimney flue for the range is made use of for another stove or for ventilation, its draft is frequently spoiled; this also may happen by providing the hood of the range with an outlet into the flue; at other times "local" vents from bath or toilet rooms or water-closets tapped into the smoke flue, interfere with the draft. The larger ventilating pipes should under no circumstances be connected to a chimney flue. A special kitchen vent flue should always be provided for the vent register under the hood of the range.

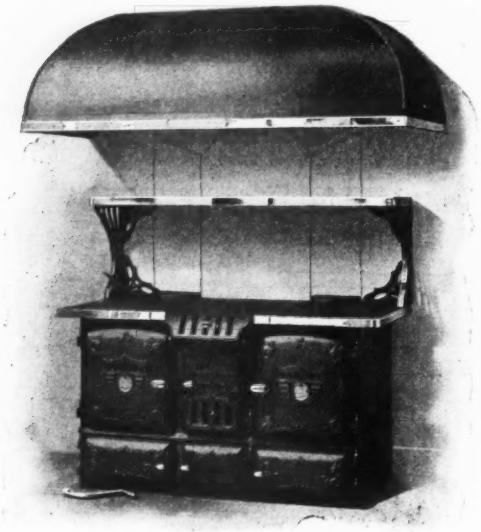


Fig. 7. Mott's "Defiance" Open-set Coal Range.

Safeguards Against Danger of Fire.—A contemplation of the fire statistics compiled by the underwriters easily convinces one that defective flues are the most prominent and frequent cause of fires. Out of 2,314,225 fires which have occurred in the United States, no less than 70,715 were found upon examination to have been caused by defective flues. Hence it is important to use the utmost precautions in building chimney flues. In the case of a shingle roof the flue should be carried well above it to lessen the danger of sparks setting the roof on fire. The use of asbestos shingles is to be recommended, and better still are roofs with incombustible material, such as slate, tile, composition roofs, or those of tin or copper.

A kitchen range should never be set on a wooden floor. It should either set on a cement foundation or a hearthstone, or else the cooking stove should be raised on legs or supports, and the floor under be provided with a galvanized iron or tin lining. Cooking stoves should never be set against a stud partition, for many a fire has been caused in this way. The partition should be specially prepared for the range, the wooden laths cut out, and the hollow space filled with brick or tile and plaster. Even where a stove stands away from a partition it is advisable to protect the partition or any woodwork by bright tin shields. In the case of gas stoves, the woodwork of the wall should always be shielded by a metal lining or by asbestos boards.

Selection of a Cooking Range.—The different appliances manufactured for the cooking of food have always claimed much attention from householders and house builders. In former times there was not so much difficulty in selecting a good kitchen range, but in recent years so many different kinds and types have been introduced into the market that the selection is rendered much more troublesome. Each manufacturer naturally claims that his is the most efficient and most economical range in the market; on the other hand, every householder knows that some ranges burn more coal, that some bake or roast better or quicker, that some require less attention and maintain the heat better than others.

The fact is doubtless true, that some ranges are built of better materials, and that in some more attention than in others is paid to a good design and finish. In short, it is evident that the selection of this apparatus must be made with care and that it cannot be made without some knowledge of the various requirements. The preparation of clean, dainty and wholesome dishes, or what may be termed "good cooking," can be accomplished only in a perfect kitchen range.

It is true economy to select a kitchen range with a large fire box, as those with small fire boxes burn up a great deal more coal in proportion.

In order to determine what the proper requirements of a kitchen range are, it is desirable that one be familiar with the various cooking operations already described, and likewise that one should have some knowledge of the fuels used in cooking.

Causes of Troubles With Ranges.—There are numerous reasons why coal ranges give trouble and fail to work satisfactorily, and it is not always easy to find the causes or the proper remedy. In general it may be said that either the chimney, or the range itself, or the connections between the range and the flue are faulty.

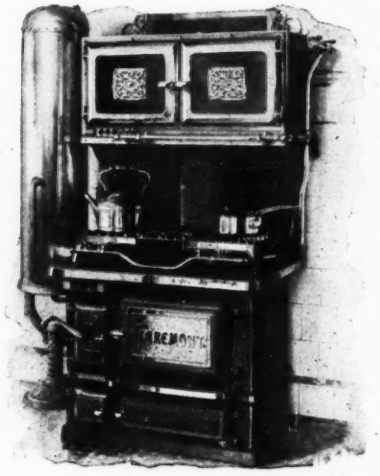


Fig. 8. Mott's "Claremont" Combination Coal and Gas Range.

When a range has been properly cleaned in all its parts, and when one has ascertained that there are no obstructions or passages choked with ashes, the principal cause of trouble is an insufficient chimney draft.

A range may give trouble because of obstructions in the range itself. The fine coal ashes stop up the body of

the stove and choke the current; hence ranges and cooking stoves should be cleaned frequently and well.

Too short connections are sometimes the cause of trouble, in which case the remedy consists in carrying the smoke pipe to the ceiling and then into the flue.

Care of the Range.—The life of a cooking range depends to a large extent upon the care which it receives. Usually the fire-brick lining burns out first, and its quick destruction is often due to carelessness, such as when much wet garbage is dumped into the fire pot. Grates warp from the constant effect of the heat of the fire or from exposure to hot ashes in the ash pan or the bars break from careless or hasty shaking.

The top plate often cracks through one reason or other.

To obtain good results, a kitchen range should be intelligently cared for and the following hints may be found useful:

Ashes should be removed every morning. All flues should be kept clear. Before shaking or poking a fire, the bars should be turned over once daily, to remove the clinkers. The brick lining should be kept at all times free from clinkers.

The fine ashes should be removed by gently rocking the grate. This assists in preventing the formation of clinkers, which check a fire. Remove the ashes from the ash pan before they accumulate too high, so they will not interfere or cut off access of air to the fire. Ashes also absorb heat, and cause the grate bars to bend and burn out.

Clean all flues in the range thoroughly once a month. Have the smoke flue cleared of soot at least once in six months. Fine ashes are carried over by the draft of the choked, the oven does not bake well.

Remove the top covers and clean the inside, dusting the fire, accumulate in the flues, and when they become ashes from every part of the range. Rub with a damp cloth, polish the top plate with black lead, enameline or

Fig. 9. Mott's "Defiance" Combination Coal and Gas Range.

other approved stove polish and brush it well to polish up thoroughly. This helps to keep the bottom of cooking vessels clean.

Management of Ranges.—(1) How to start the fire: The drafts should be open and the checks closed. Pile on the grate some crumpled paper, sticks of kindling wood laid crosswise to give the air free access, and finely cut up hard wood on top. Now ignite the paper and as soon as the wood burns freely, put on a thin layer of coal. Wait until this ignites and put on more coal. Now close the smoke damper, and keep the draft door at bottom of grate open. If you desire to keep the fire smouldering, open all checks. Remember that by an intelligent use of checks and drafts one can increase or diminish the heat of a fire at pleasure.

(2) When a freely burning fire is wanted there should be plenty of air circulation through the fuel, hence do not

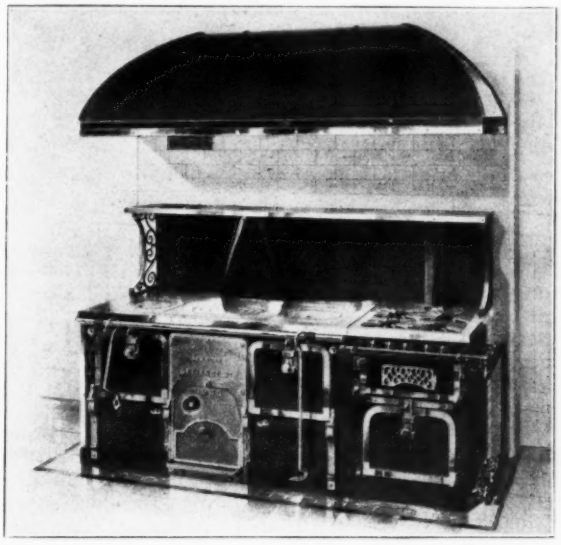


Fig. 10. Mott's "Defiance" French Combination Coal and Gas Range.

pack the coal too tightly, nor fill the fire pot to the top of the brick linnig.

(3) Admission of cold air under the fire causes it to burn hotter; admission of air over the fire causes the fire to burn more slowly and with less heat.

(4) The smoke damper should only be opened for a few minutes when a rapid fire is wanted. Close it as soon as possible, to prevent unnecessary waste of heat.

(5) To obtain a very hot oven, open the draft and close the check dampers. To reduce the oven heat, partially close the draft damper. If still less heat is required close them completely. When the fire is not in use open all checks.

(6) Do not shake or poke a fire too often: this spoils the fire. Keep the fire well cleared of ashes, especially around the water back.

(7) Do not permit the coals to burn to white heat. Close the drafts as soon as they look red hot.

(8) Do not stir or poke an anthracite coal fire on the top. Apply the poker at the bottom of the grate. Insufficient attention to the fire and allowing it to burn to a white heat cause formation of clinkers. These can be removed by manipulation with the poker. The use of quick-lime or oyster-shells on the fire, to loosen the clinkers, has been successfully tried.

(9) Before shaking, racking, or dumping the grate, pull out the damper under the oven door, to make the dust pass off into the smoke flue. This damper should always be kept closed, except when shaking.

(10) Should coal gas escape from a range, there must be trouble with the draft, either in the range, the smoke flue, or the chimney flue. Inspect the flues to ascertain if they are choked with soot or otherwise obstructed. As already explained, any leakage of draft spoils a fire, therefore see that there are no holes or leaky joints.

(11) A fire is banked for the night by opening the top of the range so as to expose the top of the fire to the cold air; it will then burn low.

(12) **Gas Range.**—Make sure that the air mixers of the gas burner are set right, so as to admit a proper amount of air, thereby securing a good bluish or greenish flame and a perfect combustion of the gas.

When a gas cooking burner is lit see that the flame burns blue. If there is a reddish or yellow flame, imperfect combustion takes place. In that case turn off and re-light the burner.

A PLUMBER'S HOBBY.

An Instance of Self-Sacrifice for Public Benefit.

By Chas. B. Starkey.

In the beautiful land of Somewhere is a city which we will call Progress. Now while this may be an apt term for that place today, it has not always deserved such praise. In fact, it took a plumber to stir matters up and, at length, secure for his place a benefit which will endure for generations to come. Fair to look upon is the scenery surrounding this city in the country of Somewhere. Fertile are the nearby farms and a stream of profitable commerce flows constantly in and out of this thriving place, yet for all this the people had long lacked a suitable outing place.

Within the limits of Progress there dwelt a man with a Hobby. Strange though it may seem this man strove vigorously to keep the wolf from the door by following the occupation of a plumber. Please bear this fact in mind for plumbers, as a class, are not generally accustomed to doing the "heavies" in public affairs, and still less when such a course must be pursued at a sacrifice to their own business interests.

In fact, it might be remarked in passing, that mighty few men in any business (let alone a plumber) dare to put forth efforts which will make enemies, and "hurt their trade." This plumber was not rich. We have his word for it that his business afforded him "merely a comfortable living," and from the events which took place we venture to believe that it would have afforded much more profit had he confined his entire time and efforts to it, rather than giving days and weeks toward public interests. Let us digress for a moment. Not far from the city, in years gone by, there was a property of some forty acres which was used as a race-track and fairground. For one reason or another this property gradually ran down and became less valuable for that purpose. Upon this property were fine groves of trees. By purchasing and expending some money it could be made an ideal park for pleasure and amusement. The stage setting now includes one plumber, a run-down property upon the outskirts of the town and the general public who, in the absence of anything better, were organizing numerous fresh air and picnic parties to various points upon the horizon. Right here is where the Hobby breaks in and gets busy.

This plumber got a "hunch" one day that a public park in the city would be a mighty good thing. As time passed this hunch became a hobby, impossible to resist, and he began to put affairs in motion to the end that the city might acquire the property.

Of course some people got "peevish" right away and all kinds of objections were raised. Many bitter enemies to the project developed upon all sides who endeavored to crush the scheme.

After a long drawn-out fight, the plumber came out on top and secured the property for the purpose desired and the work of transformation was begun. A limited amount for improvements was set aside by the city of Progress.

A smaller sum was obtained by renting the grounds for entertainments upon various occasions and some very public-spirited citizens contributed various amounts of cash. A committee was appointed of which our plumber was made chairman and, working to the best advantage possible with the means at hand, this property has been converted into one of the most popular resorts of the city, and I take off my hat to the man who made this thing possible.

I am mighty glad that our craft can produce a man who is capable of sinking his private interests for the good of all.

"What did he get out of it?" remarks some individual, wise in his own conceit. "This plumber might better have spent his time in boosting his own business."

Lest I be accused of "four-flushing" with a bit of sentiment, I will come down to hard facts and state that he probably did not get one red cent of money. The chances are that he many times put into the project a few dollars of his own. He won the hearty hatred of many people of his town, but they finally got over it, and he undoubtedly lost work that he might have obtained by attending strictly to his own interests and all this for what?

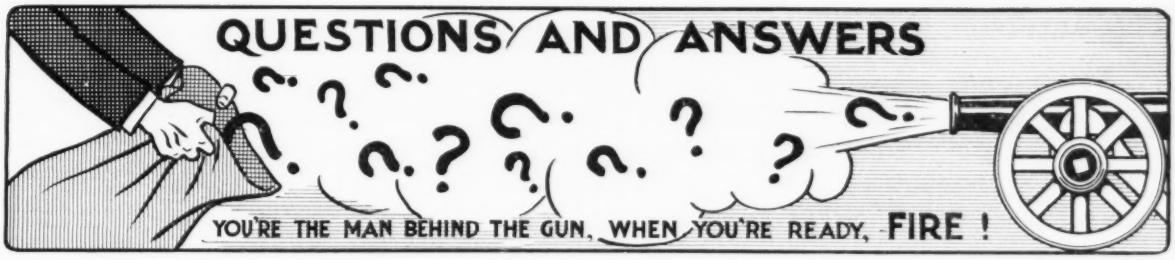
"To give to the poor who can not have all, at least a share of what is coming to them in this world," to quote his own words. It was estimated that in one year's time something like 250,000 people visited this park and enjoyed its many advantages, which fact shows that the people do appreciate a suitable outing place, when it is furnished.

Now here is an instance in real life where a man without millions of money at his command, gets busy on the job and succeeds in securing for his fellow citizens a real and lasting benefit. I have had the question shot at me upon various occasions: "What can a plumber do?" and this is one of my replies. I stand for the point that a man can accomplish nearly anything in this world that he desires, but I want to state that he must be a man in all that the word signifies. He can not be a sport, nor a grafter, nor a weakling, nor a deceiver. A man bound to succeed will find some means to gain the point. Though defeated a hundred times he always "comes back" and finally wins out, though he may have been many years upon the road.

Our man held a proper appreciation of the duties of a citizen and had the nerve to put up a stiff fight in order that others might receive the benefit of his efforts.

Reward? Why talk about that? My friend, do you not know that if even a single citizen of the town of Progress had not had sense enough to thank the man for the good he has done, the satisfaction that he would derive from having done what he knew was a benefit to thousands, this peculiar sense of quiet contentment would be its own reward. One learns, sometimes, to do a thing. because it is right and not for the purpose of winning applause. It is a pleasure to be able to mention this instance, the more so because it brings out some of the better qualities of the plumber. There are other good points and I want to remark that for some time past the plumber has ceased to be the "goat," and it is gradually dawning upon the craft at large, that they have a part to play in the march of events and that they are due to mix up with history, and give to our craft a very much greater and more efficient representation in the affairs of the world than has been done in the past.

To be an all-right story this article should end with a moral but I figure that each reader is capable of constructing one for himself.



WILL THIS SYSTEM WORK WITHOUT PRESSURE?

Editor "Domestic Engineering":—Enclosed find two sketches, one for hot-water heating without basement under the building. We do not want to put in an overhead system, but would like to know if this system (Fig. 1)

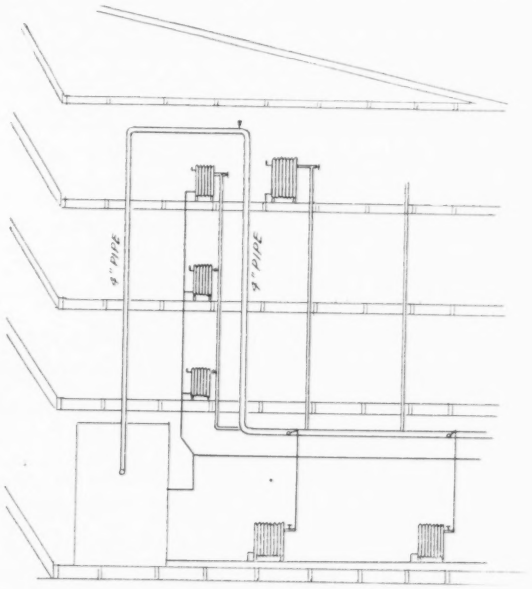


Fig. 1. Sketch of Hot-Water Heating System.

would work perfectly by running up a 4-in. pipe near the ceiling of the fourth floor and then return back down under the ceiling of the first floor of the building; then run the pipe as usual to the different floors above from below and returns to same; then place an air valve and expansion tank at the highest point. Also would like to know whether it would work better with the Honeywell system than it would with an open system.

The other sketch (Fig. 2) is for steam, showing boiler in the basement and radiators on the same floor; in other words the top of the radiators level with the water-line of the boiler. Will these radiators work successfully if a check valve is put on the return pipe of the radiator and run to the bottom on the water-line in the boiler? Yours truly,

Everett, Wash. F. H. C.

We have answered several inquiries of late in regard to pressure systems and the general idea of hot-water circulation, and the editor of this particular department is in favor of a pressure system because he has tried it out and knows that by its use things can be accomplished with hot water that could hardly be done otherwise. In regard to this particular layout we wish that some of our readers who follow these columns from week to week, would reply. We have been dealing out information freely and would like to get more replies containing jobs that do work in order that we may have some recent examples to allude to from various parts of the country.

This is not at all intended as a refusal to answer this

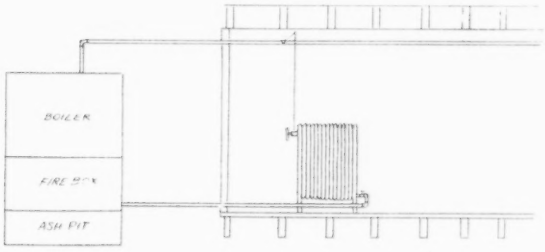


Fig. 2. Sketch of Steam-Heating System.

question, because we are here for the purpose of being asked; but however great or varied one man's experiences may have been there are others, and it is from them that we wish to hear. Let no one be backward about coming forward and to any one who has any definite information to offer we would say that we shall be glad to publish it. What we desire is actual facts and not suppositions.

CAN A FLAG-STAFF BE MADE OF STEAM-PIPE?

Editor, "Domestic Engineering": I have a job of erecting a flag-staff for a country-school district and they wish it to be constructed of steam or gas pipe, said pipe to be about 50 or 60 ft. high. Can you tell me the best way to make the joints and how to support the base? Any information upon the subject will be thankfully received.

Rochester, N. Y. Irondequoit.

We should not use pipe of the same size for the entire length of the pole, neither should we join the pipe together with the usual coupling, for the threads cut upon the pipe for such a purpose would render the joint somewhat weaker at that point than the rest. Probably the safer way would be to make the pole in three or four sections, each section so much smaller than the preceding that the pipes will telescope. In so doing we should consider that about 18 in. would be sufficient. Holes can be then drilled through the places where the pipe laps and rods put through, the end being battered down smooth upon the outside.

The bottom of the pole can be secured if sunk about eight feet in the ground and dirt and broken rock tamped firmly into place.

Do not forget to put the pulley and rope in place at the top of the pole before it is erected to its place.

HOW TO PREVENT LIME AND SEDIMENT FILLING WATER-BACK.

Editor "Domestic Engineering":—I take a keen interest in your articles on heating and hot-water supply. Often I read of plumbers complaining of lime and calcite deposits filling water-backs. I never read an article on this subject but it always reminds me of the time, many years ago, when I was holding the important and lucrative position of house plumber in a large hotel in the West. The principal part of my duties was taking care of the water-backs in the ranges. I had four large French ranges, with a one and one-half in. pipe, box coil water-back in each, and on account of the hardness of the water, owing to the high percentage of lime contained in it, the water-backs would last but a short time. I have known a new fresh coil to become filled solid with lime in six weeks. After months and years of this misery I happily conceived a plan whereby I could install a water-back so that it would last for years. My plan was the double boiler proposition. The double boiler is not a new combination by any means, but I think you will agree with me that my double boiler, made use of in this way is entirely new and original. Most any boiler shop can turn out a simple double boiler suitable for this purpose—two discs of iron with the inner shell riveted on and tested tight, then the outer shell riveted on. You can see at a glance by my diagram (Fig. 3) my method of

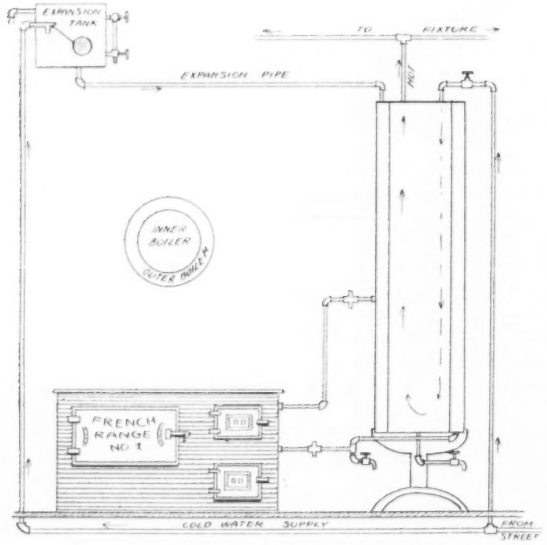


Fig. 3. Double Boiler Connected to Water-Back.

piping. The water-back is connected to the outer boiler in the usual manner, and the supply pipe from the street and the hot pipe to the fixtures are connected to the inner boiler in the usual manner. The outer boiler is fed from the expansion tank to the left, which in turn is filled through the cold water pipe.—J. H. Williams.

CAN RADIATORS BE PLACED NEAR THE FLOOR?

Editor, "Domestic Engineering":—I herewith enclose rough sketch of steam plant in church basement, upon which I would like a little information. The flow and return pipe at present run close to ceiling in basement, and pipe coil radiators are hung on the ceiling so that all the heat is at the ceiling. What I would like to know is, can these radiators be hung near the floor, as in sketch (Fig. 4) with a return pipe run under the floor back to the boiler, with valves Nos. 1, 2, 3, as shown, so that the radiators and return can be drained? If done this way, will the radiation have to be increased? Will

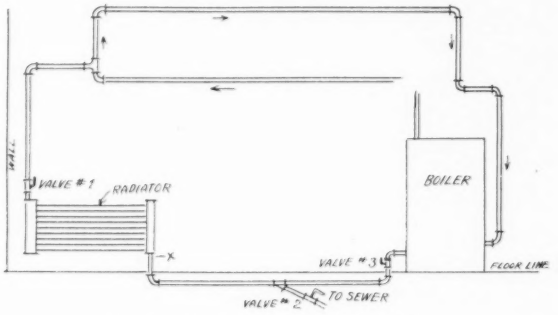


Fig. 4. Heating System for a Church.

special valve have to be added at X? Will it work satisfactorily?

Hoping that I have made myself clear, and that you can give me an early reply, I remain, Yours,

M. L.

We assume that this is a steam job. As drawn the radiator would be below the level of the water line. Now this radiator is shown with a connection to the sewer and this would, in time drain the boiler to a certain extent and render an automatic feed necessary to the boiler.

We think that a steam trap would be best, which would return the water to the boiler. There are several such traps advertised in "Domestic Engineering" which are said to operate upon a very low pressure. Several radiators can be made to heat by hot water, while the rest of the system works on a steam pressure. This can be done if the supply to the hot-water radiators be taken out below the level of the water line of the boiler some six or eight inches.

TO FIND THE NUMBER OF POUNDS OF STEAM NECESSARY TO HEAT A CERTAIN QUANTITY OF WATER.

Editor, "Domestic Engineering":—Can you through the columns of your valuable paper, tell me how to find out how much steam it takes to heat any given quantity of water? In so doing you will assist me in a problem which I have to work out. Any pointers will be received with great pleasure and appreciation.

Albany, N. Y. **Hudson.**

The rule used in such a case as stated by an authority upon the subject is to "multiply the number of pounds of water to be heated by the number of temperature degrees the water is to be raised, and divide the product by the total heat of steam at the pressure it is to be used, less the sensible heat at atmospheric pressure. Expressed in a formula it is as follows:

$$S = \frac{w\ h}{L - 1}$$

The explanation of the formula is that

S = the weight of steam in pounds.
w = pounds of water to be heated.
h = degrees F. the water is to be heated.
L = total heat of steam at the pressure used.

l = sensible heat at atmospheric pressure.

An example is given which runs as follows:

How many pounds of steam at 70 lbs. pressure will be required to heat 7,500 lbs. of water from 48 deg. F. to the boiling point?

$$\frac{7{,}500\ (212-48)}{(1{,}174-180)} = 1{,}237 \text{ lbs. of steam.}$$

Another and easier rule which gives approximate rules is to allow one pound of steam to six pounds of the water to be heated. In the above example it may be seen that this would give 1,250 lbs. of steam.

HOW TO CONNECT THESE TWO RANGE BOILERS.

Editor, "Domestic Engineering":—Enclosed please find rough drawing (Fig. 5) of two hot-water boilers which I wish to connect together and heat with a No. 2 Mott hot-water heater. These boilers are both in the same room and just room for two boilers and heater. Heater will have to be placed between the boilers. I would like to know the correct way to connect them together and

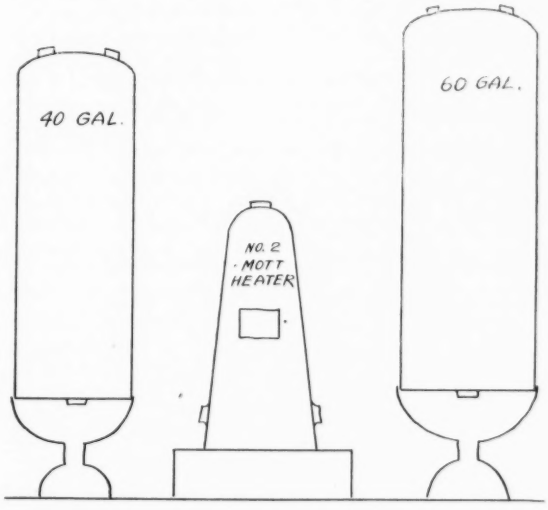


Fig. 5. Boiler and Heater Connections.

have both work properly. Both boilers are to supply one bath-room which has several showers in room. Hoping to hear from you at an early date, I remain, yours truly.

Auburn, N. Y. **F. O.**

I do not see why our friend does not use one tank of 100 gals. capacity instead of two tanks of 60 gals. and 40 gals., respectively. Certainly it seems to me that a 100-gal. tank, slung horizontally from the ceiling would occupy less space. If desired to make a side connection of the range boiler in each case, to the supply pipe which will come from the top of the heater, and the respective heights of the range boilers and heater are as indicated in the sketch, the range boilers should be raised, or the heater dropped, until the side supply of each range boiler will be higher than the point of the connections on top of the heater. I should not bullhead a tee at top of heater. Take off supply for the 40-gal. tank first, thus favoring the larger tank containing more water. Make the connection as you would two radiators on one supply line where you desired to favor one or the other.

ELECTROLYSIS IN WATER PIPES.

Editor, "Domestic Engineering":—Can you tell me what electrolysis is and what causes it?

St. Louis, Mo. **"Show Me."**

Electrolysis may be defined as the damage inflicted upon water-mains, gas-mains, etc., by the action of electric currents which are in the ground. The main cause has been found to be the escaping currents of electricity from some railway system which has not made proper provision for the return current which, seeking an easier route, leaves the rails and goes to the piping. The current finally leaves the piping and at the point from which it departs from the pipe to the ground, corrosion of the metal takes place which in time renders the pipe of no use.

WHY USE THE RANGE BOILER AT ALL?

Editor, "Domestic Engineering":—Would it be practical to install a hot-water system and not use the range boiler or storage tank at all? Since the range boiler is the cause of so much trouble, why not omit it entirely and connect the system direct with the water-back or water-coil? An answer through your "Questions and Answers" department would be greatly appreciated.

Minneapolis, Minn. **Hennepin.**

It would be entirely possible to connect the water-back or heating-coil to the system direct, and leave out the range boiler entirely, but we are afraid that the house so connected would soon go shy on hot water.

Tanks are used to store up hot water for use and coils and water-backs and gas heaters are used for the purpose of furnishing the heat to the water in the tank. Hot water could be obtained from the water-back but the quantity would be so limited as to be of small service to the household.

NOISE CAUSED BY THE CITY WATERWORKS PUMP.

Editor, "Domestic Engineering":—What can be done to eliminate the noise caused by the pump of a waterworks station? In a certain house, which is connected to the waterworks system, every stroke of the pump can be heard with great distinctness. How can I overcome this difficulty? **N. F.**

It would be interesting in this case to know whether or not this particular house was the only one in the city in which the noise was noticed. If so, something is wrong about the manner in which the house is piped.

If there are many other residences and stores in which the sound of the pumping can be noticed then it is up to the waterworks company to remedy the noise.

We will assume, until informed to the contrary, that the trouble lies in this one residence only and proceed to answer the question from that viewpoint. We should say that if the cold water pipe were run along the ceiling of the cellar and spiked to the beams, or in some places touched the soil pipe, that any noise would be very liable to be heard. Another reason might be that this particular house was very near the pumping station and would receive the benefit of the noise to a greater extent than some house farther away.

We would suggest breaking all means for the direct communication of sound in the water pipe and we would do it by means of a flange union (not an ordinary union),

placing an extra thick rubber gasket in the flange. We would also use a pressure reducer and set it so that there would not be more than 15 or 20 lbs. pressure upon the house.

If any of our readers have other suggestions to make, we should be glad to publish them in an early issue.

THE COIL IN AN ICE-BOX.

Editor, "Domestic Engineering":—I have a job to put a coil in an ice-box. The water to be cooled is used in a department store five stories high and a drinking fountain on each story.

The coil is to be made of galvanized pipe. Kindly let me know what size and length of pipe should be used. Thanking you in advance, I remain,

Montgomery, Ala. **B. D. C.**

This question is somewhat indefinite but we believe that we can handle the matter in such a manner that one will not go wrong. If I were to put that job in I would go at it in the following manner:

I presume that I should run a line of ¾-in. galvanized pipe from the outlet of the coil in the box to the top faucet in the building. Now it might be necessary or desirable to run this line one inch in size.

The circumstances of the case would have to govern this point. I would next, from either the blue print or actual measurement in the building, find out exactly how many feet long this line would have to be.

Having ascertained that point I would go into the shop and find out how much water a 12-in. length of ¾-in. pipe would hold and then compute how much water would lie in the entire line of pipe. This will give some idea of the cold water necessary to be held on tap, so to speak. I should figure, from a general idea upon the subject that it would not be possible to get enough pipe into a coil to hold water (cold) to fill the rising line of pipe and I do not believe that in merely passing through the coil, when being drawn, that the water would get cool enough for drinking purposes in that climate, with which I am somewhat familiar. Consequently, I would build the coil of larger-sized pipe than the pipe line and I would have the coil hold at least double the amount of water that the rising line and branches would contain. To find out how many feet to put in the coil it would be necessary to measure the amount per foot that the different sizes will hold and when this is ascertained, the amount which the pipe line will hold being known, it is an easy matter to find out how many feet of pipe must go into the coil. Then, upon measuring the dimensions of the refrigerator or ice chest, the exact dimensions and shape of the coil can be laid out. Please observe that this is an explanation that any fitter or plumber can understand and quite readily work out his own salvation, and it is given in such shape that the plumber should be able to go at it in a mechanical manner with all the material handy for finding the answer for himself.

SOME IDEAS FROM NEW ENGLAND.

We are in receipt of a couple of communications from Providence, R. I., which, with the illustrations, we take great pleasure in publishing and would state that it makes the heart of the editor of the "Questions and Answers" department thump with joy to see the evidence of ideas that exist among the craft.

A handy and neat tool bag (Fig. 6), devised and made by J. L. Goodwin, Providence, which any plumber or steam fitter can easily duplicate. The ends are one-inch pine sawed out round, nine inches in diameter, and are held in place by a frame of one-inch flat iron, two feet long and nine inches wide (to correspond to the diameter of the ends) and to which the ends are screwed, having the iron extend across the grain to prevent splitting. The whole is covered with heavy canvas, starting at one of the upright strips of iron and nailing to edge of

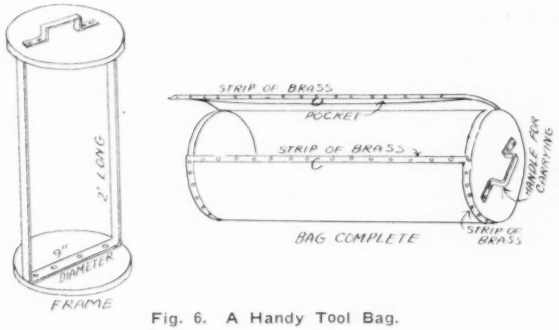


Fig. 6. A Handy Tool Bag.

wooden ends, round to within about six inches of the iron strip and a loose piece of canvas left long enough for flap or lid. Outside of this and attached as on the canvas is a good piece of carpeting, brussels preferred. Strips of brass are screwed around the edges of the ends, with round headed brass screws. A strip of brass riveted to the strip of frame iron, with the edges of canvas and carpet between, secures them firmly in place. The edges of the lid are bound by riveting between strips of brass; in the long edge a slot is made in the brass, which shuts down over a staple riveted to starting strip, which is intended for a lock. A pocket is made between the canvas and carpet, just inside the lid, for wiping cloths, etc. When complete it makes a tool bag of sufficient capacity for any ordinary kit of tools, neat in appearance and strong.

A novel method of heating front office and show-room from stove in work-room in rear by means of a straight piece of two-inch pipe one foot long set in fire box of

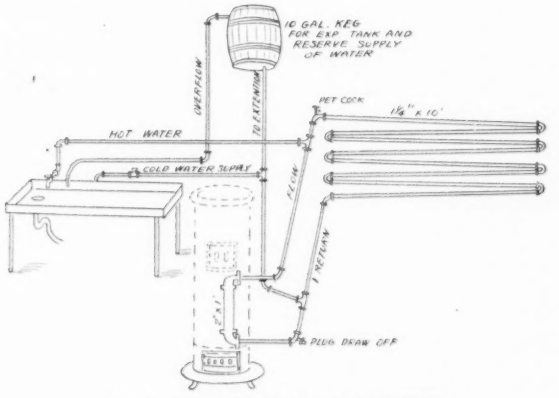


Fig. 7. Novel Plant for Heating Office.

stove supplying hot water to coil, is shown herewith in Fig. 7. A supply of hot water for sink use, taken off the flow, is also secured by this arrangement. It is surprising what a splendid circulation is secured and how efficient the equipment is, even in the coldest New England weather. This plant is installed and doing good work in the steam and hot-water establishment of Geo. L. Fish at 280 Eddy street, Providence, R. I.

Modern Conveniences for the Farm Home*

By Elmira T. Wilson, C. E.

Formerly Assistant Professor of Civil Engineering, Iowa State College.

(Continued from Page 52, January 8, 1910.)

Bath Tub and Lavatory.

A porcelain-lined or enameled-iron bath tub is the best medium-priced tub. For supplying the tub with water a combination cock is best, allowing hot or cold water to enter the tub separately or the temperature to be regulated to suit the bather. The cocks should be placed high, so as to allow of water being drawn into pitchers.

The best lavatories are those of porcelain or enameled iron, with back and overflow all formed as integral parts of the fixture. The basin cocks through which the hot and cold water come are of various shapes, the simplest being the best.

The Closet.

The water-closet is the most important plumbing fixture in the house, and should be selected and put up with particular care. A good closet should be simple, neat and strong, of a smooth material, with ample water in the bowl. Among the modern closets there is none more satisfactory than the flushing-rim, siphon-jet closet, which can be had, including the trap, in a single piece of porcelain. Porcelain is used because no other material can be kept so clean and sanitary. But even this is an imperfect protection from dirt and disease unless the bowl is flushed so as to clean it completely and absolutely. The water should be poured from the rim of the bowl, so that every part of it is perfectly cleaned. The wash-down and wash-out closets are similar in make, but are not so thorough in their action. In the wash-out closet the basin acts as a receiver, a small quantity of water being retained in it, and into this the deposit is made, to be washed out afterwards into the trap by the flush. The water in the basin is prevented from leaking into the trap by a raised edge which is apt to break the force of the flush so that its whole force is not directed into the trap, which is objectionable. The wash-down closet receives the deposit directly into the water held in the bowl by the trap. It has a straight back and a much smaller fouling surface. There is no open vent. The outlet is entirely covered with water, so that the water does not throw the soil against the side. The only advantage the siphon closet has over it is the greater force of discharge given by the siphon.

The siphon closet, like the wash-down closet, retains a certain amount of water into which filth is discharged. In addition there is a siphon trap provided with a long ascending arm, so that the water in the trap is at a lower level than the water in the bowl. The water from the flushing cistern is directed not only into the bowl, but downward into the trap itself. As a result of this discharge into the trap a siphon action is produced whereby the contents of the bowl are sucked through the trap into the soil pipe without soiling the bowl. The seal—that is, the body of water which prevents the sewer gas from escaping into the house—is deep, broad and always in plain sight.

Flushing Apparatus.

The flushing cistern or tank for a water-closet is always distinct from the main water supply. As a rule, a plain hardwood box, copper-lined, is supported by brackets from the wall about 7 ft. above and communicating with the closet by a pipe. This pipe is usually about 1½ in. in diameter and should have as few bends and angles about it as possible. The cistern should hold 2 or 3 gal. of water, all of which should be discharged at one time into the closet. The flush of the closet should be quick, powerful and noiseless, thoroughly scouring all parts exposed to fouling.

The flow into the cistern is regulated by a float valve which allows the tank to fill, the float rising with the water; when it reaches the proper level the float is entirely raised and the supply shut off. When the tank is emptied by opening the flush valve, which is lifted by pulling a chain attached to it, the process is repeated. The cistern is often provided with an overflow connected with the flush pipe, so that if the ball-cock fails to act properly in shutting off the water the surplus will escape through the water-closet to the drain instead of overflowing.

Soil-Pipe Connections.

The best closets are provided with a brass screw soil-pipe connection, calked with lead and cemented into the base of the closet. The corresponding threaded brass coupling is soldered into the end of the lead bend which connects with the soil pipe. The closet is then screwed into the threaded coupling until the base rests on the floor. The closet may be removed at any time by simply unscrewing it. No bolts are necessary through the base flanges. In setting a water-closet a neater finish can be obtained if a porcelain floor slab is put in with the finished floor.

General Suggestions.

The important need of the work is simplicty, not only in detail, but in general scheme. Construct the water-closet to be used as a urinal and slop sink and arrange to draw water through the bath cocks placed at the top of the tub. It not only saves cost, but is a great advantage to have the fewest possible points requiring inspection and care and to secure the most frequent possible use of every inlet into the drainage system. Great care must be taken not to throw into the water-closet hair, matches, strips of cloth, or anything which is insoluble and liable to clog the trap and soil pipe. A burnt match seems small in itself, but if lodged in the trap it will collect other things and cause serious obstruction of the outlet. Tissue toilet paper should be used. Its cost would be exceeded many times if a part of the system needed to be taken out to free it from newspaper obstruction. It is often found more convenient to have the water-closet with a separate entrance from the hall and entirely independent from the bathroom.

TRAPS AND VENTS.

Every plumbing fixture must have a trap to prevent the foul air from coming back from the drain through the waste pipe. In its simplest form a trap is a downward bend in a pipe, so deep that the upper wall of the pipe dips into the water held in the bend, the extent to which it dips being known as the depth of the seal. With slight modifications this is the trap most commonly used for wash basins, laundry tubs, etc. Its greatest fault is the

* Prepared and published by direction of the Department of Agriculture, Washington, D. C.

danger from siphonage; that is, the water seal may be carried out of the trap into the soil pipe by the rush of the water when the fitting itself is emptied, by the flow of water from another fixture on the same branch waste pipe, or by the discharge of water from a fixture higher up but connected to the same soil pipe. This danger is much lessened by the introduction of a system of ventilation pipes extending upward either from the trap itself or from the outlet near the trap. To avoid this extra expense of a third system of pipes, it is better to supply each fixture with one of the patent nonsiphonage traps, which should also be self-cleansing. There are several

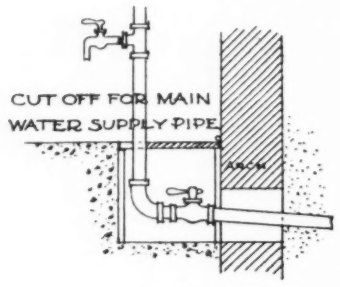


Fig. 3. Cut-Off for Main Water-Supply Pipe.

good ones on the market. It is a good habit, after emptying the wash basin, bath tub, or kitchen sink, to allow some clean water from the faucet to run into the fixture in order to have clean water in the traps. All traps should be provided wth trap screws, placed below the water line, and arranged so as to be accessible for cleaning.

Nothing short of continuous use will prevent the evaporation of the water in the traps. One with a large dip is best, but at the same time the trap must be so formed that at each use of the fixture all the filth that is delivered shall be carried away, the trap being immediately refilled with fresh water. Hair and fibers from cloth sometimes carry the water out of traps by capillary action, and care should be taken not to allow such things to enter the pipes.

THE SOIL PIPE.

The soil pipe should extend from cellar to roof in a straight line, if possible, as each offset or bend forms an obstruction to its proper flushing with both water and air. Use only "extra heavy" soil pipe of uniform thickness throughout, as the hubs stand the calking better.

Avoid if possible plumbing fixtures in the cellar if the drain must go under the floor. If it is necessary to make connections with a fixture in the cellar it is better that the main channel should run under the floor to or near the location of such fixtures that all or nearly all of its length should constitute a part of the main drain thoroughy flushed and ventilated like the rest of the system. The pipe should be laid in an open trench and so thoroughly calked that under a pressure equal to one story in height not a drop of water should escape at any point, and then it should be inclosed in good concrete, after which the trench should be filled. The soil pipe should pass through the foundation by means of an arch, and the cast-iron pipe should extend at least 5 ft. outside the foundation; from there on, a carefully laid and rigidly inspected vitrified pipe drain is to be preferred. The joint between the iron pipe and the vitrified sewer pipe should be made with neat Portland cement mortar. If there are no fixtures in the cellar carry the drain in full sight along the face of the cellar wall, or suspended from the floor beams, so the joints may be inspected. At the point where it is to turn up as a vertical soil pipe support it by a post or a brick pier. Use no short turns in the soil pipe, like "tees" and "quarter bends." Two one-eighth bends or a Y branch and a sngle one-eighth bend give a more gradual and therefore a better change of direction. Water-closets should connect to the soil pipe with a Y branch. The soil pipe should be secured along its entire length at distances not over 5 ft. with hangers and clamps or hooks, so that it will be rigidly held in position. The joints in the cast-iron soil pipe should be made by first inserting a little picked oakum into the socket, allowing none to enter the pipe; it is better formed into a sort of rope. The oakum prevents the lead from running into the pipe to form an obstruction to the flow. Enough molten lead is then poured into the hub to fill it. After the lead has cooled it is carefully hammered with a special calking tool until the space between the spigot and hub is perfectly gas and water tight. Every joint should be made with a view to being tested with hydraulic pressure.

In making this test the simplest way is to close all openings into the pipe with wooden plugs or disks or india-rubbed compressed between two plates of iron forced togethed with a screw. There is no especial advantage in applying a great head of water, for if a joint is not tight it will leak under a head of a few inches. It is generally most convenient to test the vertical pipe story by story, the plugs being inserted through the water-closet branches. There is probably no occasion to fear that work once made tight will develop leaks for many years.

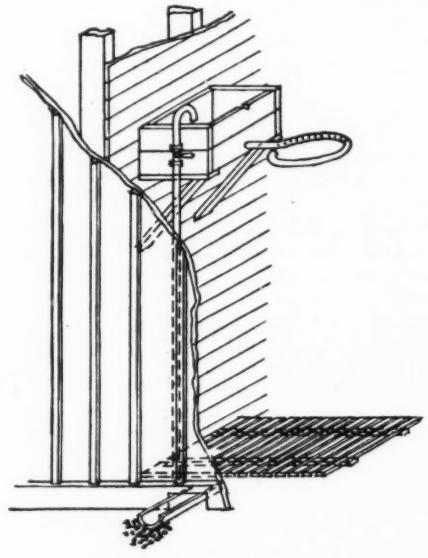


Fig. 4. Home-Made Shower-Bath.

The tendency to rust after a time, even with tar-coated or enameled pipe, being rather to close such slight leaks as may exist.

Four inches in diameter is sufficient for soil pipe, and the best results are obtained by running it full size straight above the roof and covering the top with a wire basket such as is used to keep leaves out of gutters.

There should always be a trap between the house and the sewage-disposal plant, and there must also be on the house side of it an inlet for fresh air. There can be no real ventilation of the system if it is open only at the top, but a generous inlet for fresh air on the drain outside the

house, in connection with the opening at the top of the soil pipe, will insure a free movement throughout the whole system. The fresh-air inlet must be guarded from obstruction. It may be brought out close to the foundation walls, but not too near windows and doors. If the trap is formed by the submerging of the inlet pipe in the settling chamber of the disposal system the fresh-air inlet should be placed close to this.

THE WASTE PIPES.

For all minor waste pipes lead pipe is used, as it may be bent and cut to suit all possible positions and require but few joints. Only "heavy" lead pipe should be used. As lead is quite a soft material it would not be practicable to use thread joints on it, so the joints are made by the use of solder. Where lead pipe joints to cast-iron pipe the connection should be made by means of a brass ferrule, of the same bore as the lead pipe, and soldered to it. The ferrule is introduced into the hub of the cast-iron pipe and calked tight with oakum and lead as described for cast-iron pipe joints.

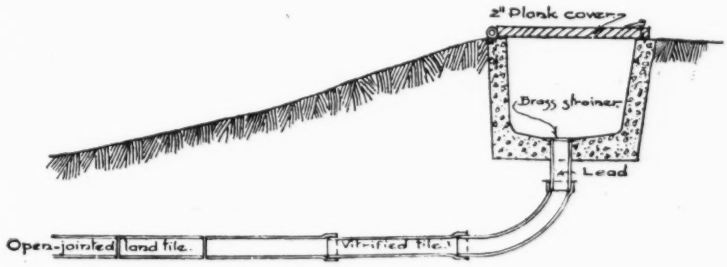


Fig. 5. Waste-Water Hopper.

WATER-SUPPLY PIPES.

The service pipe of the water supply should always have a stopcock on the main supply pipe easy of access so the water can be shut off quickly in case of a break in the pipe. Such a cut-off is shown in Figure 3. This stopcock should have a waste, so that when the water is shut off from the house all water standing in the pipe can be drawn off. The arrangement of the supply pipes should

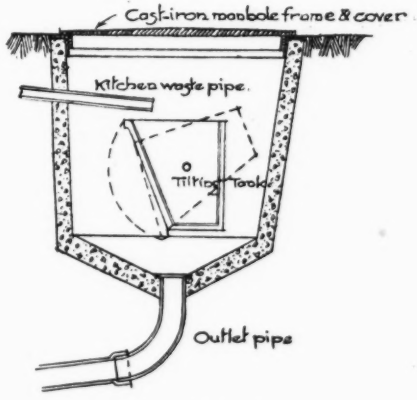


Fig. 6. Tilting Tank.

be as compact as possible, and they should be exposed to full view. No water pipe should be carried along an outside wall unless absolutely necessary, when it should be wrapped with some nonconducting material to prevent it freezing. Hot-water pipes will freeze quicker than cold-water pipes if the fire has gone out.

It is better in most cases to use galvanized-iron supply pipes.

A HOME-MADE SHOWER BATH.

A shower bath for summer use can be arranged in one corner of the wash room or, for use of the boys, in the barn. The material necessary for constructing it are enough pipe to connect to the main pipe of the stock tank, a stopcock, a box supported on brackets and lined or not as seems best, and a perforated pipe for the shower. Figure 4 shows how such a shower bath may be constructed in a corner of a barn.

DISPOSAL OF WASTE WATER.

In houses where a sewage system is not available, and the dry-earth closet is used, much may still be done to aid the housewife by the introduction of water for kitchen and laundry use. Instead of portable round tubs, oblong troughs about 3 ft. in length, 18 in. wide at the top, 12 in. at the bottom, and 18 in. deep can be built in the washhouse. Each trough should have a hole and stopper in the bottom and a gutter common to all to carry away the waste water, which, with the waste water from the bath and kitchen sink, chamber slops, and other foul water, can be daily distributed in the garden by surface or subsurface irrigation. Either method is much preferable to pouring them on the ground near the kitchen door and keeping the ground about the house continually saturated.

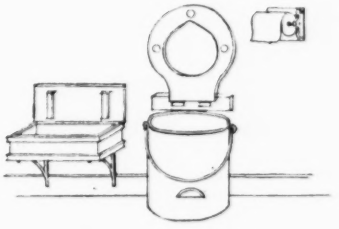


Fig. 7. Earth Closet.

For surface distribution, galvanized roof gutters pierced with holes at regular intervals, suspended between the rows of growing plants, will distribute the liquid evenly over the ground. For subsurface distribution, 50 ft. of 3-in. draintile laid with open joints and a very slight fall in one or several lines at a depth of 8 to 10 in. below the surface and connected with a hopper, as shown in Fig. 5 can be used. This hopper can be made of wood or galvanized iron, and is provided with a strainer and solid cover. That part of the pipe which is more than 10 in. below the surface should be of vitrified pipe and laid with cemented joints. The waste water when poured into such a hopper a pailful at a time will be distributed the length of the tile.

For a more elaborate system a tilting or tumbling tank (Fig. 6) can be built with pipe connections to the kitchen sink and bathroom, this tank to collect the irregular flow and empty, when full, into the drain.

EARTH CLOSETS.

Where there is difficulty in the matter of ultimate disposal without the use of a cesspool, and the consequent and apparently unavoidable risk thereby incurred of contaminating the well water, it would be better to use an earth closet. This is not wholly satisfactory, but is safer and far better than the provision so often found on farms and in villages. The house containing it should be well built and substantial, well lighted and ventilated, with a good roof and preferably plastered on the inside to insure

less exposure in cold weather. A carefully made and dry walk, screened by lattice for protection from the wind and for privacy, should be built to it. The excreta should be received in a galvanized-iron pail, not too large and made to fit close under the seat. This seat can be like that of an ordinary water-closet. Each time the closet is used dry earth is added. The pail should be emptied very frequently. With proper attention this closet need not be, and should not be, built far from the house. It would even be possible to place it in a room built against the house, the room having one door opening from the house and another opening out of doors. This would make it possible to enter from the house in inclement weather, and also to carry out the pail without passing through the house. The room should be well ventilated by a window close to the ceiling, and only tissue paper should be used. (See Fig. 7 for arrangement of pail, seat and dry-earth box.)

The earth for use in these places is to be found in nearly every field and garden and should be of rather a loamy nature, if possible, and porous. A very sandy soil is next to useless. Large heaps of earth should be collected for the year's use and dried in the summer sun. It is not necessary to use perfectly dry earth, but it is always the best.

DISPOSAL OF SEWAGE.

After the plumbing has been put into the house, to make it effective, a means must be provided to remove all liquid wastes as soon as possible and to prevent the return of odors.

Dangers of a Cesspool.

As has been previously explained, to build a cesspool to foul the ground and air is not a solution; it is only putting the trouble "out of sight." It holds the wastes in a state of putrefaction, and so will give off troublesome gases, which will, if near the house, penetrate to the cellar and then on through the house. Its liquid leachings, if these strike a layer of sand and gravel or a fissure in the rock, will penetrate an unthought-of distance to injure the quality of water of wells and springs. Such a system would never be installed if the householder realized the full effect of the nuisance he was establishing. Fortunately it is no longer necessary to build a cesspool when plumbing is introduced into the house which can not be connected to a public sewer.

Principle of Modern Sewage Disposal.

Within the last 20 years many investigations of sanitary methods for the disposal of sewage for isolated houses have been made. The working principle is this: When the air contained in the soil is brought in contact with dead organic matter in a finely divided state, a complete transformation takes place by the natural processes of oxidation and nitrification. This change is brought about by micro-organisms which multiply rapidly under proper conditions and by so doing combine the oxygen of the air with the organic matter. Air is as necessary for this purpose as fuel in a stove that is required to give off heat. It is therefore essential that the waste be deposited on or near the surface of the ground and in such a way that air reaches every particle. If the ground is saturated for a long period of time purification of the liquid will cease. If a foul liquid is thrown on the surface of the ground the water will pass off, but its organic impurities will cling to the particles of earth. Air takes the place of the water and surrounds the waste matter, the bacteria present in all fertile soils effect a combination between the two, converting the dead organic matter to harmless mineral forms needed for vegetable life. This process may be repeated indefinitely if the waste matter be supplied and the air furnished alternately. This is called the "intermittent method" of operating the disposal plant. The process of applying this principle to the disposal of sewage varies, and may be divided into two distinct steps: (1) The collection of the wastes from the house that these may be applied intermittently; and (2) their application to a natural soil by surface or subsurface irrigation, or to a specially prepared soil, as in a filter bed.

Three Systems Described.

The ground available on one farm can not be, and need not be, exactly the same as that used on another. If the surface is almost level and under cultivation the subsurface system of distribution could be adopted, whatever the method used for collecting the flow from the house. The liquids are retained for a certain length of time and then rapidly discharged into open-jointed tiles, laid near the surface, thus securing a uniform distribution throughout the entire length of the drain. While the tank is refilling time enough is allowed for the water to pass away and the air to enter and accomplish its work. This manner of purifying the liquid wastes of the household where the water-closet is or is not used has been tried with entire satisfaction.

Another method of getting the liquid wastes on the land is by surface irrigation. The most marked feature of the change from the privy to the water carriage system is the great dilution which the organic matter undergoes. Instead of concentrated organic wastes, unsuited for direct use as a fertilizer, we now have a dilute mixture which seldom contains more than 1 part in 500 of anything but water. Of course this can not be discharged in a haphazard manner upon the land, but if the intermittent method, as explained above, be followed and the discharge be regulated to avoid saturation of the ground, the sewage can be disposed of without unsightly or offensive results. The area of the ground required is about the same as for subsurface disposal. A sloping surface in grass, or partially wooded, or a cultivated field, say of corn, would be entirely suitable. The area required depends upon the character of the soil and the amount of sewage to be purified. For a family of five, if the soil be reasonably porous, a plat of ground 40x50 ft. should be ample.

The third method of exposing the liquid wastes to the action of the bacteria is used when the available area of the land is limited or if on account of the character of the soil too large an amount of drains would be necessary to handle the sewage to be purified. Under these conditions specially prepared beds of sand, gravel, or screened cinders are used as a filter material. The sizes of these beds vary with the amount and character of the sewage and its previous treatment, but for a family of five under reasonable conditions and a proper preliminary treatment, a bed 25 ft. long, 4 ft. wide and 4 ft. deep should answer, although one 5 ft. deep would give a purer effluent.

(To be continued.)

CLIPPING SNIPS.

J. V. Madden, Sherman, Tex., has secured the contract for the installation of modern plumbing and heating systems in the new union passenger station which is now being erected at Denison, Tex.

The Hughes Heating and Plumbing Co., 502 Fourth Avenue, South, Minneapolis, Minn., has secured the contract for the plumbing and heating in the bungalow which is now being erected for J. R. Ralph in Minneapolis. The consideration is $750. The Hughes company also secured the contract for the plumbing and heating in the new addition which is now being erected to the plant of the Flour City Ornamental Iron Works in Minneapolis, and it also has the contract for the plumbing and gas-fitting in the Cedar Rapids Savings Bank Building at Cedar Rapids, Iowa.

EXPANSION IN PIPES AND HOW IT IS OVERCOME.

By Phoenix.

The other day I was in a certain office upon business where my attention was at once attracted to the radiator in the room in a most emphatic manner by the protests it was uttering to the best of its ability. It was knocking to beat the band. Who wouldn't knock under such treatment? It would make anybody knock, yes even Phoenix. Now this giddy radiator was reared up on its front legs with the hind legs entirely clear from the floor by at least an inch, and consequently had a surplus of steam and water in its chest, so to speak.

"Can't something be done with that radiator?" said the man of business to me. "What in the dickens is the matter with it, anyway?"

"Did you ever know that a steam pipe would expand when hot?" I asked. "Sure," said he. "Is that the cause of all this?" "It is," I replied.

"Well, what do you think of a mechanic who will do a trick like that?"

"Well, to say the least," I answered, "I guess he forgot to allow for expansion."

That pipe will be fixed when they get around to it, some day.

On a small house job, where the runs of the mains are, say, fifty feet or under, and risers only to the second story, the matter of expansion may be generally overlooked, unless everything is put in such shape that the pipes are extremely rigid. Such house jobs are generally run in such a manner that there is nearly always room for the pipe to free itself, and therefore the matter of expansion will give little trouble. The most that will be noticed is a noise, sometimes caused by the radiator either in heating or cooling. This is a slight noise as the radiator shifts upon the floor a fraction of an inch or so in position. Now, suppose a main steam pipe starts directly from the top of the boiler in a mechanical manner and runs directly for 150 ft. without a turn and the far end must come within half an inch of some wall. In such a case as this, the expansion of the pipe when hot will send it against the wall, with the result that the wall may be broken. In case the wall is the stronger and the fittings withstand the pressure (which in all probability they would not), the main will acquire a hump which will probably tear loose some of the branch connections, somewhat like the much abused radiator referred to in the beginning of this article. The expansion of the riser line lifted the valve end of the radiator clear of the floor. The branch in the cellar was firmly fastened in place, and so the radiator at the top end of the line had to go up. If the branch had been less firmly fastened the probabilities are that the radiator would have maintained its position and the expansion would have pushed the end of the branch down, thus forming a pocket which would have caused a case of "hammering."

Expansion, if unprovided for, will put such an extra strain upon the pipes that many leaks will result and in such cases it is nearly impossible to get a tight job. As soon as one leak is stopped another one will appear at a different place and a man may tinker for days at a time and then have only a mighty bum job.

The amount of heat governs the expansion of a pipe. By that I mean the pressure carried. Now, at 215 degrees the expansion would be about one and one-half inches on a pipe 100 ft. in length, while at 338 degrees the expansion on the same pipe would be nearly two and one-half inches.

It will, therefore, be seen that if one is in an extremely tight place, where each quarter inch counts, the temperature must be taken into consideration. I mention this because I remember of a very good fitter who fell down at this very point. He figured the expansion for the low pressure and when the high pressure was turned in the line expanded much more than he expected and several six-inch fittings were cracked before one could say "Jack Robinson."

This could have been avoided entirely had the fitter but reflected for a moment when he was getting out the line of main steam pipe.

Probably one of the most common methods of taking up the expansion is by means of the "swing joint."

This can be easily made of ordinary pipe and fittings and where the expansion is not too great and the room sufficient it is the easiest installed. Do not use white lead upon the joints, but put on some good lubricator in order that the joints may turn easily. Graphite is an excellent thing to use in such a place. If the room is limited and the situation is such that expansion must be provided for there are regular swivel joints of brass which can be obtained and used for this purpose.

For larger pipes joints known as "stubbed" joints are used, but these are open to the objection that they frequently need attention in the form of repacking.

A kind which is looked upon much more favorably by many people consists of a corrugated copper tube with brass rings placed so as to make stronger the corrugations.

In places where it is desirable to allow for the expansion on lines of large pipe, and the room is not limited, bent pipe in various forms may be employed, the pipe being obtained already bent can be inserted in the line by means of flanges.

The form known as "scissors" may also be used for a similar purpose.

It will be remembered that on all lines where expansion joints are employed the line of pipe should be firmly anchored at various points depending somewhat upon the length of the steam line.

It will be found that if these matters are attended to in a careful and mechanical manner, very many of the annoyances which seem to be visited upon the job will be done away with. It certainly pays when laying out any job to look it over carefully from every point of view and provide for what the job is going to do.

MASSACHUSETTS FLOTSAM.

G. C. Winter, Southbridge, Mass., has the contracts for installing a steam-heating plant in Dr. Oswald Gregory's new house on Hamilton St.; heating and plumbing in Stephen Laflin's new house and furnace-heating and copper-work in the new church at Sturbridge.

Frank L. Tibbetts and Elmer S. Stack, West Somerville, Mass., have transferred their plumbing and heating business at 28 Newbern St. to the Somerville Heating Co.

MAINE JETSAM.

The second set of bids for plumbing the new city hall at Portland, Me., were received and opened by the building commission on January 3 as follows:

Myers & Mahoney, Portland, $16,370; M. C. Hutchinson, Portland, $17,900; Reed, Stewart & Blunt, Portland, $17,387; A. L. Dow & Co., Portland, $14,000; Tucker & Co., Boston, $17,829; William B. Johnson, Boston, $21,837.

The contract was awarded to A. L. Dow & Co. for $14,000. The first set of bids for this work, received early in December, were all beyond the amount at the disposal of the commission.

BURNING COAL WITHOUT SMOKE.

By Chas. L. Hubbard.

The passing of smoke ordinances in many of the large cities and the general activity among their citizens in securing an abatement of the smoke nuisance makes the matter one of especial interest to those in charge of the heating plants of office buildings, schools and other public buildings as well as those connected with manufacturing or power plants. For this reason something touching this subject may be of interest to the readers of "Domestic Engineering."

A recent bulletin of the United States Geological Survey contains considerable information upon this matter, resulting from a thorough investigation of existing conditions in many of the large cities, supplemented by numerous tests carried on at their fuel-testing plants at St. Louis and Norfolk, Va.

A brief summary of the results obtained and recommendations made may be of interest to those who are endeavoring to reduce the amount of smoke produced at their plants.

The three general methods of utilizing coal for power and heat are—in steam boiler and other furnaces, in gas-producer plants and in by-product coke plants. Of these, the first is by far the most important at the present time and methods for improving the conditions in the ordinary plant will be first considered. It is a well-known fact that smoke is due to a lack of air at the proper temperature at the point of combustion, which results in the liberation of free carbon in the form of soot and smoke. Some of the principal reasons for the formation of smoke are insufficient draft; unskilled firing; too small combustion space; burning of wood, paper and other refuse; sudden change in the load and continued overloading. In connection with this it may be stated that it is possible to burn coal without smoke the same as gas, gasoline or kerosene oil, if the equipment is properly designed and operated. Each of these fuels will give off smoke if the conditions are not favorable.

Within the last few years there has been a great improvement in the methods of burning coal under steam boilers and today there are many plants which are burning bituminous coal practically without smoke. This has been brought about by improving the design of the furnaces and by greater skill on the part of the fireman. Authorities upon the subject of combustion agree that the following requirements are necessary for smokeless operation:

1. The coal should be fired at frequent intervals and in small quantities, as the nearer the conditions approach that of a continuous feed the better the results obtained.
2. Air should be supplied slightly in excess of the theoretical amount required, the greater part of which should be admitted through the fuel bed. This should be supplemented by an auxiliary supply above the fire to burn off the gases.
3. The temperature of the furnace should be sufficiently high to ignite the gases given off from the fuel bed.
4. A combustion chamber of sufficient size should be provided to give a thorough mixture to the gases and air and permit a complete combustion before reaching the boiler surfaces.

Briefly, then, the efficiency of a furnace and the degree of success reached by any equipment for the prevention of smoke will depend on the skill of the fireman, proper design of furnace and setting, character of the coal and capacity of the boilers and furnaces as compared with the load carried. The most important of these is the personal element. Both the owner and fireman must be interested to obtain the best results. Intelligent supervision in the boiler room to secure proper air admission and care in firing will result in saving the losses due to smoke or unconsumed gas and to heating an excessive amount of air. At many plants such supervision has reduced the coal bills from 5 to 20 per cent, depending on the grade of coal and methods previously used. It is becoming the practice in nearly all the large power plants to employ a boiler-room expert and many of them have chemists who make frequent tests and investigations to determine the conditions most favorable to economy. This might well be carried out by cities in regard to schools and other public buildings. If a plant is poorly designed even a trained man cannot obtain satisfactory results. A poor draft is responsible for a great deal of trouble in the boiler room and again, in many plants the grate surface is not properly proportioned to the load carried. This can be remedied in hand-fired furnaces, but not without considerable expense in stoker plants.

The hand-firing of plain furnaces often violates all the principles laid down for securing good combustion. The coal is usually supplied in large quantities at long intervals and the result is a lowering of the temperature of the furnace and an increase in resistance to the flow of air through the fuel bed, thus causing the generation of large quantities of combustible gas, which cannot be burned for lack of air and the necessary amount of heat. Hand-fired furnaces with ample combustion chambers and adjustable openings for air admission are suitable for some kinds of coal if tended by experienced and careful firemen.

Furnaces with mechanical stokers of the overfeed type, including chain grates, which feed the coal gradually and coke it under a fire brick arch, are used more widely than any others, except hand-fired furnaces.

The inclined grate stokers will burn either high volatile coals or coals high in fixed carbon.

Chain-grate stokers are successful in burning high volatile coals, such as are found in Indiana and Illinois.

Underfeed stokers that automatically feed the coal are usually successful with either high or low volatile fuels, when properly installed, and operate at a reasonable rate of combustion.

The chain-grate stoker requires less attention than any other type and can be operated without smoke when properly installed. They have not yet been adapted to burning low volatile coals, such as are largely used in the East.

Down-draft furnaces have shown decided economy in many plants and have been fairly successful in the prevention of smoke. Whether they can be run without smoke depends on the required capacity, the kind and size of coal and the attention.

Many furnaces are burning coal unsuited to them and under the load-conditions it is impossible to prevent smoke.

To change to another kind of coal or even to another size of the same coal will often prove satisfactory.

E. Krantz, Round Lake, Iowa, will install a hot-water system in Mr. Halberg's residence in that town.

J. B. Weiant, New Britain, Conn., has recently secured contracts for installing plumbing systems in the following structures: One eight-family building on Maple St., one six-family building on Broad St., one four-family building on Trinity St., two three-family houses on South Stanley St., and a bungalow on Maple Hill.

PROGRAM FOR FIFTH ANNUAL MEETING OF AMERICAN SOCIETY OF INSPECTORS OF PLUMBING AND SANITARY ENGINEERS.

The Committee on Publication for the fifth annual meeting of the American Society of Inspectors, to be held at Trenton, N. J., Jan. 20, 21 and 22, 1910, has just issued the following program, subject to changes and additions.

This program indicates that the society is going to have a most successful meeting.

PROGRAM.

(So far as at present arranged.)

"History is well enough, but constant alertness for improvement is better."—Schmidt.

Thursday, Jan. 20.—Opening Session.

Meeting from 10:00 a. m. to 12:30 p. m.; Young Men's Republican Club's Auditorium, 141 Hanover St.

1. Registration.—Every person attending any meeting of the convention is requested to register at the earliest hour practicable, securing a number and the souvenirs which will be given to each attendant.
2. Address of Welcome.—On behalf of the State of New Jersey, Honorable Franklin Fort, Governor.
3. Announcements.
4. Miscellaneous business.
5. Reports of committees.

Thursday Afternoon.

Meeting from 2:00 to 4:00 p. m.

6. Address of Welcome.—On Behalf of the City of Trenton, by Walter F. Madden, M. D., Mayor.
7. Address.—On Behalf of the State Board of Health, by Bruse S. Keator, M. D., Secretary.
8. Address.—On Behalf of the Health Department of Trenton, by Alton S. Fell, M. D., Health Officer.
9. Address.—On Behalf of the City of Trenton, by Abram Swan, Jr., City Engineer.
10. Topical discussion.

Thursday Evening.

This session will be open to the delegates, their ladies and the general public.

11. President's Address.—By Charles B. Ball, Chief Sanitary Inspector, Health Department, Chicago, Ill.
12. Illustrated Paper.—Lantern slide exhibition of details of the manufacture of pottery from the clay state to the finished product. With a short talk describing each slide, by Edward C. Stover, Asst. General Manager of the Trenton Potteries Co., Trenton, N. J.
13. Illustrated Paper.—"History of the Manufacture of Water Closets," by Herbert S. Renton, Chicago, Ill.

Friday Morning, Jan. 21.

Meeting from 10:00 a. m. to 12:30 p. m.

14. Paper.—"The Privy: Its Uses, Abuses, Dangers and Arraignment," by Burton J. Ashley, C. E. Chicago Ill.
15. Paper.—"Evolution of the Water Closet," by William B. Maddock, of John Maddock & Sons, Trenton.
16. Paper.—"Siphon Jet Closets: Can They Be Improved?" by C. E. Schmidt, C. E., Baltimore, Md.
17. Paper.—"Development of Sanitary Ware Bodies in the United States," by Edward C. Stover, Asst. General Manager of the Trenton Potteries Co., Trenton, N. J.
18. Topical Discussion.—"Standardization of Material," Eugene S. Willard, Leader of the Discussion.

Friday Afternoon.—Visits to the Potteries.

The delegates and visitors will be divided into three groups, according to their numbers in registration and these groups will be taken in charge by members of the local entertainment committee and taken to the various potteries, where the process of manufacturing sanitary ware, toilet ware, and art ware will be shown.

Friday Evening.

Meeting from 8:00 to 10:00 p. m.

19. Illustrated Paper.—"Factory Sanitation," by Philip Mueller, of Decatur, Ill.
20. Illustrated Paper.—"Application of the Cleveland Plumbing Code," by H. J. Luff, of Cleveland, O.
21. Election of officers.
22. Miscellaneous business.
23. Paper.—"Distinctive Mark and Equipment of Comfort Stations," by Frank K. Chew, Editor of the Metal Worker, New York.
24. Paper.—"Public Comfort Stations," by W. E. Hinsdale, New York.
25. Paper.—"Lavatories and Urinals," by Charles Weelans, Manager of the Monument Pottery Co., Trenton, N. J.

Saturday Morning, Jan. 22.

Meeting from 10:00 a. m. to 12:30 p. m.

Saturday Afternoon.

Meeting from 1:30 to 3:00 p. m.

26. Paper.—"Floor Connecttons for Water Closets and Slop Sinks," by J. J. Cosgrove, Sanitary Engineer, of Philadelphia, Member of the Society.
27. Paper.—"Relationship of the Plumber and the City Engineer," by Abram Swan, Jr., City Engineer, Trenton, N. J.
28. Paper.—"The Plumbing Inspector and the Health Department," by T. J. Claffy, Asst. Chief Sanitary Inspector, Chicago.
29. Miscellaneous business.

Saturday Evening.

Banquet of the Society.

Hotels.

The meeting of the Society was fixed for Thursday, Friday and Saturday because the state legislature of New Jersey is in session on Monday, Tuesday and Wednesday, and it would be impossible to get hotel accommodations earlier in the week. The local committee acting in harmony with the committee from the Chamber of Commerce reports the following hotel accommodations:

The Hotel Windsor will be the headquarters for the association and the following are the rates: Rooms with bath, $3.50 per day, American plan. Rooms without bath, $2.50 per day, American plan.

Hotel Sterling, State and Chancery Sts., make a special rate of $1.00, $1.50 and $2.00 per day, European plan.

The Trenton House, Waren and East Hanover Sts., $2.50 to $2.75 per day, European plan; $1.00 to $2.00 American plan.

Barlow Hotel, $1.00 per day upward, European plan.

Manze Hotel, $1.00 per day upward, European plan.

Central House, North Warren and Perry Sts., $1.00 per lay upwards, European plan.

Entertainment of Ladies.

On Thursday, Jan. 20, at 2:00 p. m., the ladies will be taken in a special car to the Maddock Lamberton Pottery Co., and shown the manufacture and decoration of table ware.

Thursday evening a theater party will be given to the ladies.

Friday morning the ladies will be taken in automobiles, weather permitting, to visit the "Old Barracks," where the Revolutionary soldiers were encamped, the State House, and other points of historical interest in Trenton.

Friday afternoon the ladies will be taken in a special car or automobile to the Lennox Potteries' show room, where specimens of fine bone table ware and decorated novelties will be shown.

Friday evening the ladies will be taken to visit the Trenton School of Industrial Arts.

Saturday morning the ladies will be given an automobile ride about the city of Trenton to historical points of interest not already visited, and luncheon will be provided at 1 p. m. at the Country Club, or if the weather should not permit this automobile ride a trolley ride to Princeton University, ten miles distant, will be provided.

Exhibits.

The local committee acting in harmony with the committee of the Chamber of Commerce have arranged for space in which exhibits or manufactured products and appliances may be shown. The exhibit room is directly under the auditorium in which the meetings will be held. The Society rule is that during the session of the campaign, the exhibit room must be closed and locked. There will be no charge for space for exhibits. Application for such space may be made to Edward C. Stover, care of Trenton Potteries Co., Trenton, N. J., and arrangement for space must be closed on or about Jan. 17.

Additional Papers.

A number of additional papers are promised, but the committee is unable to give the titles in full.

Railroad Rates.

If one hundred delegates or more attend the convention special railway rates may be had, each delegate to take a certificate receipt when he purchases his ticket to Trenton. Even in case delegates from New York and Philadelphia or other towns are able to get the regular rate, which would be less than the special convention rate, they are requested to take a certificate receipt just the same, as these certificates will assist in making up the required number of one hundred, in order to secure reduced rates for those coming from greater distances. If over one hundred delegates take convention receipts, which are to be signed by the proper officer at the convention, they can purchase tickets for the return journey at three-fifths of the cost of one fare.

Delegates coming from points west of Chicago or St. Louis, should buy a straight ticket to either Chicago or St. Louis and from that point take a certificate from Chicago or St. Louis to Trenton.

Local Committee on Arrangements.—Edward C. Stover, George Feaster, A. M. Maddock, W. B. Maddock, C. R. Metzger, Geo. D. Dorsey, J. J. Cosgrove, P. J. Madden.

PROGRAM FOR THE SIXTEENTH ANNUAL MEETING OF AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS.

Secretary W. M. Mackay, of the American Society of Heating and Ventliating Engineers, has just issued the official program for the sixteenth annual meeting of the society, to be held in the Engineering Society's building, 29 West 39th street, New York city. The program covers such a wide area of the heating and ventilating field that an unusually interesting and profitable meeting may confidently be expected. The program in full is as follows:

Opening Session.

Tuesday evening, Jan. 18, 1910, 8:00 p. m.
Report of Tellers.
Report of Committee on Air-Washers. S. R. Lewis, Chairman.
Discussion.
Report of Committee on Standards with reference to House-Heating.
Boiler Ratings. J. H. Kinealy, Chairman.
Discussion.
Report of Special Review Meeting Committee on Heating Boilers. P. H. Seward, Chairman.
Discussion.
Topics for Discussion:
No. 1. "Methods for Testing House-Heating Boilers to Get the Most Accurate Data."
No. 2. "The Influence of Low-Pressure or Vapor-Vacuum Systems Toward Lifting Water from Boiler to Mains and Radiators."

Wednesday, Jan. 19, 1910—Afternoon Session.

2 p. m. Reading of Paper: "A Method of Determining the Sizes of the Pipes of a Hot-Water Apparatus," by J. Jeffreys, London, England (member of the Society.)
Discussion.
Reports of Special Review Meeting Committees.
"Hot Water Heating," W. M. Mackay, Chairman.
Discussion.
"Steam-Heating Small Buildings," Charles F. Newport, Chairman.
Discussion.
"Furnace Heating," James D. Hoffman, Chairman.
Discussion.
Topics for Discussion:
No. 3. "The Amount of Water to be Evaporated to Maintain a Proper Humidity in a Home in Zero Weather."
No. 4. "The Proper Method of Determining the Size of Mains in Heating Systems using a Forced Circulation of Hot Water."

Wednesday Evening, Jan. 19, 1910.

Annual Reception and Dinner.—On the adjournment of the afternoon session, there will be a general reception to the members, their ladies, and guests, in the parlors of the New Grand Hotel, Broadway and Thirty-first St. from 6 to 7:30 p. m. At the close of the reception, the Annual Dinner will be served in the Dining Hall. Tickets for the dinner can be obtained from the Secretary.

Thursday, Jan. 20, 1910—Morning Session.

10.30.—Reading of Paper: "Performance of Heating Guarantees," by Wm. Kent, member of the Society.
Discussion.
Reports of Special Review Meeting Committees:
"Tests," D. D. Kimball, Chairman.
"Standards," R. C. Carpenter, Chairman.
Discussion.
"Fans and Fan Systems," B. S. Harrison, Chairman.
Discussion.
"Radiators and Heaters," W. W. Macon, Chairman.
Discussion.
Topics for Discussion:
No. 5. "The Relative Efficiency of Exhaust and Live Steam in Heating."
No. 6. "The Duty of the Members to the Society's Committees."
No. 7. "The Recognition of the Heating and Ventilating Engineer by Those Requiring His Services."
No. 8. "Safeguarding the Profession."
No. 9. "Endowments for the Society to Further its Work in the Interest of the Public."

Thursday, Jan. 20, 1910—Afternoon Session.

2 p. m. Reading of Paper: "Variability of Interior Conditions in School Rooms," by H. W. Whitten, member of the Society.
Discussion.
Installation of Officers.
New Officers Assume their Duties.
Reports of Special Review Meeting Committees:
"Compulsory Legislation," John F. Hale, Chairman.
Discussion.
"Ventilation," Thomas Barwick, Chairman.
Discussion.
"Central Heating Plants," John R. Allen, Chairman.
Discussion.
"Electric Heating," T. N. Thomson, Chairman.
Discussion.
"Steam-Heating for Large Buildings," John F. Hale, Chairman.
Discussion.
Topics for Discussion:
No. 10. "The Objection to Placing Dampers in Heat and Vent Flues of a Fan-System Reducing their Area."
No. 11. "The Relative Efficiency of 180 degree Hot-Water Systems, Two Pound Gravity Steam, Steam Below Atmosphere without Mechanical Appliance, Furnace with Outside Air Supply, Furance with Inside and Outside Air Supply, Furnace with Air Supply from Each Room, Furnace with Fan, and Pressure and Vacuum Steam with Fan, and Wrought and Cast Blast Heaters."
No. 12. "The Relative Cost of Operating Vacuum Systems of Exhaust Steam-Heating Per 1,000 sq. ft. of Direct Radiation with 5, 10, 15 and 20 inches of Vacuum."
Adjournment.

WILL SOON BE READY FOR BUSINESS AGAIN.

National Steam Specialty Co.'s plant at 230-232 Washington street, Chicago, was partially destroyed by fire Thursday night, January 6. The loss was fully covered by insurance. Temporary headquarters have been established at Room 215, Teutonic Bldg., Washington street and Fifth avenue, Chicago, and Mr Newton, president of the company, expects to be ready for business and have the plant in operation in less than two weeks.

NOW IN NEW PLUMBING SUPPLY DISTRICT.

Geo. W. Heiland, manufacturer of plumbing specialties, has removed his office and headquarters from 99 Beekman St. to 312 W. 34th St., New York City. This location is in the heart of the new plumbing supply district in Manhattan, and it is within two or three blocks of the new Pennsylvania and Long Island Terminal, the new General Postoffice and within half a block of the Ninth Ave. Elevated station, and therefore easy of access to out-of-town as well as city customers. A handsome showroom has been installed in the new location, which will in the future also be the New York office of the Beekman Sanitary Specialty Co.

The Bridgeport Plumbing Supply Co., Hartford, Conn., has filed articles of incorporation with the state secretary.

The Metal Market

NEW YORK METAL MARKET, JANUARY 11.

Copper, Prime Lake	$13.95
Copper, Electrolytic	13.75
Lead	4.75
Spelter	6.25
Antimony, Cooksons	8.50
Straits Tin	32.90

CHICAGO IRON MARKET, JANUARY 12.

Lake Superior Charcoal	$19.50-$20.00
Southern, No. 2 Foundry	18.35- 18.85
Northern, No. 2 Foundry	19.00- 19.50

January 11, 1910.

Foundry iron was the same as the week previous.
$1 more a ton than year previous.
Copper was ¼ cent more a lb. than month previous.
¾ cent less than the year previous.

NEW YORK METAL MARKET.

New York.—Dealers' buying prices are as follows:

Heavy crucibled copper	$12.37½ to	$12.62½
Light copper	10.87½	11.12½
Plumbers' cocks and faucets	9.75	10.00
Heavy lead	4.40	4.50
Tea lead	4.05	4.15
Solder joints	7.00	7.25
Block tin pipe	31.00	32.00

CHICAGO OLD METAL MARKET.

Dealers' buying prices are as follows:

Clean heavy copper and wire	$12.75
Light copper	11.12½
Heavy composition	11.75
Heavy yellow brass	9.00
Light brass	7.00
Heavy lead	4.25
Tea lead	3.70
Mixed pewter	24.00
Block tin pipe	30.00

FAVORS FEDERAL REGULATION OF THE COPPER MARKETS.

A press telegram from London, England, dated January 8th, states that Daniel Guggenheim, president of the American Smelting and Refining Company, has thought the present moment opportune to advocate federal regulation of the copper markets. Following directly upon the President's special message recommending similar action in the case of the railroads and taken in connection with recent rumors of a huge combination of all the copper mining companies, his statement is received with interest. The American Smelting and Refining Company is capitalized at $100,000,000 and owns plants in Colorado, Montana, Nebraska, Illinois, Utah, Mexico, Alaska and elsewhere. Mr. Guggenheim bases his recommendations on the demoralization not only in the business of mining copper, but among those interests which use manufactured copper in their processes, incident upon fluctuations from 25 cents a pound for copper to 12 cents a pound. Mining, he says, is a hazardous enterprise, requiring under modern conditions very large outlays of capital, and in need, more than any other industry, of a stable market. Stability, he believes, can best be obtained by federal regulation. "I deprecate all unnecessary interference with business on the part of the government," says Mr. Guggenheim, "yet I appreciate the necessity for it and can not but admire the result which has been obtained by the German government in its effort to foster German commerce. Many articles of German production, like our own production of copper, are largely exported and the German government has taken a very lively interest in so regulating the production and sale of such articles as to bring about the full return to the empire warranted it by the economic situation. The price of copper metal should not be a matter of speculation, but our aim seems to be to sell our products to European consumers at panic prices. The people of the United States are throwing away millions of dollars every year and wasting the mineral resources of their country by bad economic policy. Some means must be devised whereby this unsatisfactory condition may be done away with."

SYRACUSE MASTER PLUMBERS HOLD ANNUAL MEETING.

The first regular meeting of the year of the Master Plumbers' Association of Syracuse, N. Y., was held in the Knights of Columbus rooms, owing to the fire which occurred in the Snow building, that rendered the association's quarters untenable.

The constitution and by-laws call for a meeting every Tuesday evening, except holidays, and a fire is not considered a holiday. Election of officers being set down for this meeting, was carried out as per program, resulting in the election of Timothy X. Donovan, president; Thos. E. Clay, vice-president; B. Jos. O'Donnell, secretary; Jas. McDonald, treasurer; John Lavelle, sergeant-at-arms. These officers, together with the retiring president, Chas. A. H. Kienzle, constitute the board of directors of the association.

The executive committee reported that they had leased premises at 606 S. State St., as temporary quarters for the association, until its regular rooms in the Snow building will be refurnished. The reports of the different officers show the association in good condition, with a substantial deposit to its credit, and all bills paid.

Chas. G. Hanchett, for so many years connected with the association, and who lately retired from the business was in attendance and addressed the members, giving them his experience obtained in the business, as well as some good advice, all of which was attentively listened to by the members.

The entertainment committee reported its work well in hand, and that it would entertain the association at lunch, with music by a quartet, after the meeting.

On behalf of the association Secretary B. Jos. O'Donnell presented to Mr. Hanchett, a traveling bag, so that in his wanderings about the country he might have something to remind him of the boys he left behind.

After an evening of sociability the meeting adjourned to meet the following Tuesday at 606 S. State St., where the members will try to keep up their reputation as one of the best associations in the state.

OBITUARY.

Clarence C. Mulford, heating engineer and inventor of a heating boiler which bears his name, passed away on Sunday, January 2nd, at his home, 215 Park place, Brooklyn, N. Y., of a complication of diseases. He was born in Cairo, Ill., in 1858 and had lived in Brooklyn since 1899. He was a member of the American Society of Heating and Ventilating Engineers and he is survived by his wife and a son.

SIDNEY FROHMAN ACCEPTS NEW RESPONSIBILITY.

Sidney Frohman, president of the Threading Machine Co., Sandusky, O., was last week elected treasurer of the Hinde & Dauch Paper Co., in which he holds a large interest. The Hinde & Dauch Paper Co. is a $300,000 corporation but its assets are very much in excess of that amount. The concern owns and operates paper mills in Sandusky and Delphos, O., Hoboken, N. J.; Muncie, Ind., and Toronto, Canada. Mr. Frohman's many friends in the trade are congratulating him on this new honor and responsibility.

PACIFIC COAST LETTER

There is not a great amount of work now being carried on in the plumbing line in San Francisco and the result is rather disappointing to those who had figured on doing an unusually large business during the winter months. A few months ago there were promises of a great deal of work for this winter but this has not materialized as was expected and but an average amount is being done. Many of the San Francisco plumbers are now devoting considerable of their attention towards getting settled in permanent locations and a great many moves will be made during the next six months. According to the notices that have been sent out, the buildings erected within the fire limits since the fire without permits must be removed prior to June of the present year and as many plumbers are now located in these temporary quarters they must soon be looking for new locations. At the present time a great many of them are located in the residence districts and for a time after the fire these locations were just as easily reached by the public as the downtown districts. Now, however, that business of other kinds is centered in the former business section of the city, many plumbers are finding that their places of business are not easily reached and that as a result they are losing business. In moving downtown, locations on back streets are chosen and the shops that are being set up there are, as a rule, smaller than the old ones from the reason that rentals now are much heavier than ever before. There is also a tendency on the part of the local plumber to carry but little stock and for this reason less space is required. In former years elaborate showrooms were maintained by many of the local plumbers but these are now practically a thing of the past and plumbers are using the showrooms of the wholesale dealers in plumbing supplies as never before.

There is still a large amount of second-hand material in the plumbing line being thrown upon the market and this will influence the local trade for a long time to come. Wrecking operations will be largely brought to an end by next June when all of the temporary structures will have been removed but second-hand goods in the plumbing line will be marketed for years to come as some large stocks are being held by some of the large wrecking companies and supply houses that have sprung up to care for this class of business. The use of this second-hand material is not being confined to San Francisco but some large shipments are being made to outside points where business has been secured through the naming of exceptionally low prices. Some dealers are selling this stock strictly on its merits but there has been considerable complaint made that second-hand goods have been sold as new stock, slightly damaged. That the selling of this old stock has had a very depressing effect upon the local market is the unanimous opinion of the local wholesalers and they are anxiously waiting for the time when business will once more be placed on an equal footing.

This is moving time with the Crane company, and within a short time the big new building on Second St. will be occupied by this firm. Stock has been stored there for some time but the offices have been maintained at the old location at Second and Howard Sts. The new building is the largest on the Coast devoted entirely to the wholesaling of plumbing and steam-fitting supplies and its location is an admirable one, being not only close to railroad and water facilities but close to prominent car lines, making the place easily reached by customers. This concern is now busy erecting a building of its own at Los Angeles and will soon be serving its Coast trade from its own structures.

Active construction work has commenced on the Hearst Bldg., Third and Market Sts., and this structure will call for an immense amount of plumbing and heating material as it is to be a very large building. The construction of the building is in the hands of Mahoney Bros., and the plumbing contract will be let through them.

City Attorney Long has advised the Board of Public Works that the bid of Hansbrough Bros. Co., for the erection of the Townsend-St. pumping station of the auxiliary salt-water supply system must be rejected as invalid, though it is the lowest offer, because of being signed by the secretary, instead of bearing the official name of the corporation. The company insists, however, that its bid of $139,000 is valid and has taken legal steps to compel the Board of Pubilc Works to award it the contract.

The Starr Estate Co., which is erecting a two-story frame building at Stockton and O'Farrell Sts., has let the plumbing contract to the Thompson Co. for $632.

New school work is still occupying the attention of local plumbers and an important contract has been let this week for work on the Holly Park school. The plumbing work is to be done by Edward Grundy for $4321 and the vacuum-cleaning apparatus will be installed by the American Air-Cleaning Co. for $674. The heating and ventilating contracts will be announced at an early date.

The San Francisco Association of Master Plumbers is making preparations to place into effect the recent ruling in regard to "sub-contracting" and commencing with next month no contracts will be accepted from general contractors. Due notice has been sent to architects, general contractors and all interested in the business and but little difficulty is expected in getting the plan in working shape.

PERSONAL MENTION.

E. Willard, of the Great Western Potteries Co., Kokomo, Ind., was in Chicago and called on some of his friends in the trade.

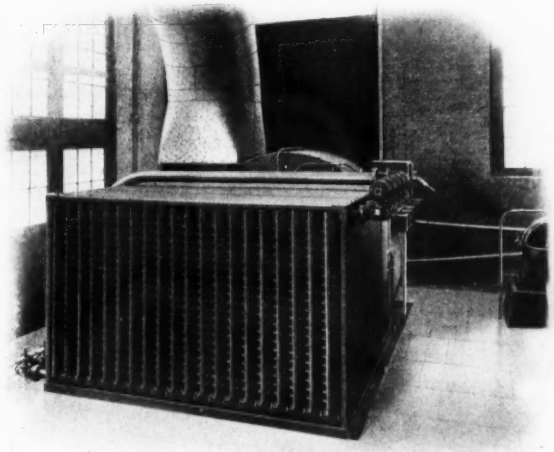
E. V. Brigham, secretary-treasurer of the Union Sanitary Mfg. Co., Noblesville, Ind., was in Chicago the early part of this week.

P. E. Hanlin, Cincinnati representative for the L. Wolff Mfg. Co., Chicago, and Jno. J. Bailey, who travels the South for that concern, were registered at the Stratford Hotel, Chicago, this week.

Bernard F. Kessler, manager of the Kessler Plumbing Co., 7 River Ave., Duquesne, Pa., who underwent an operation for appendicitis at a hospital in Pittsburg last November, is now again able to attend to business.

Vento Values

"If I could simplify my work as economically as the Vento has simplified hot blast heating equipment," said a prominent engineer, "I should feel that I had gone a long step forward." Which sums up in a few words just what the Vento Hot Blast Heater stands for.



One Group of Vento Heaters, Standard Installation, Twenty Sections Long

Vento values are many: Greater efficiency, saving of labor, fewer parts, fewer joints, easier installation, saving of space and a host of other simplifying features to reduce the time, labor and expense of a hot blast job. Vento values grow in number on closer acquaintance.

AMERICAN & IDEAL
RADIATORS & BOILERS

A Heating Outfit is More Efficient with NORWALL and SYLPHON SPECIALTIES

AMERICAN RADIATOR COMPANY

General Offices, 282-286 Michigan Ave., Chicago.

New York	Cincinnati	Cleveland	Atlanta	Bradford, Ont.	Denver
Philadelphia	Boston	Milwaukee	Minneapolis	Seattle	St. Louis
Pittsburg	Buffalo	Indianapolis	Kansas City	Omaha	San Francisco
Washington					

TRICKS THE PLUMBING INSPECTOR WATCHES OUT FOR.

Plumbing Inspector Reuben S. Bemis of Providence tells some interesting anecdotes which show some of the tricks for which a plumbing inspector must be constantly on the watch. In spite of the fact that every building is inspected, there are many cases where the work is not properly done, and rather than do it over again the plumbers and drain-layers will cover up the evidences of a bad job in various ways, trusting that the inspector will fail to detect them, according to the inspector.

"One drain-layer, a combative Irishman, gave himself away," says Mr. Bemis. "He was laying the drain in the cellar of a new house. The inspector stepped inside the door, and thinking he heard voices in the cellar, stopped to listen. He soon discovered that the Irishman was talking to himself.

"'Murther!' ejaculated the son of Erin in a mellow brogue, 'Phwat the divil will I do! The inspictor's comin' and 'tis him will find it out. He will. An' thin again mebbe he won't! I'll chance it anyway!'

"The inspector saw that he had come in unheard. He tiptoed out and reappeared, this time at the door of the cellar.

"'Drains all right?' he inquired of the Irishman.

"'Sure,' said the drain-layer.

The keen eyes of the inspector ran over the drain-pipe. At the side of one of the lengths he noticed a small heap of sand. He went over to it, kicked it away and found that it covered up a leak in the pipe.

In one house a year or so ago Inspector Bemis was giving the water-test to a large soil-pipe. There was no leak, but in addition to this test, he examined all the joints. One of them looked fishy. He took a chisel, jabbed that part of the pipe a half-a-dozen times, and was rewarded by getting squirted with water from a leak. The plumber who had put in the pipe found after it had been set up and jointed that it leaked at one joint. It was a long and costly job to undo the work already done and make it right, so he tried to conceal it.

There is a preparation known in the trade as "balsheo," a black cement. This is melted and applied to the pipe where the leak occurs and when it hardens looks as black and shiny as the black iron pipe. That was the preparation used in the soil pipe which the inspector exposed.

A soil-pipe empties into a drain, and, in order to have good sanitary conditions, the joint of the drain should be carefully made and the cement used should come up high on the pipe and spread out on the side.

"I was looking at one of these joints some time ago," said Mr. Bemis, "and it seemed all right at first glance. Something that didn't look absolutely natural attracted my attention, and, taking up an iron tool lying near, I poked the cement. I found that instead of cement it was ordinary house-mortar with sand sprinkled over to give it the right color."

As a general rule in modern plumbing where a pipe joins a drain or another pipe, it has a trap, a U-shaped or double-curved section, serving to form a water-seal to prevent the passage of air or gasses. If there is no trap, the sewer-gas and foul air escape. Mr. Bemis tells of a case where the drain-layer swore there was a trap, and investigation showed that the man lied.

There was a rain-water-conductor down the side of a brick house on one of the principal streets of the city, and the drain-pipe on the cellar bottom was carried out to meet the water-conductor. At the jointure there was supposed to be a trap to prevent the sewer-air from escaping and being carried into the open windows of the house.

The drain-pipe was full of water and the inspector asked the drain-layer whether there was a trap in the water-conductor. He was told that there was. Not satisfied with the answer he took two or three small pebbles and dropped them into the water-conductor. Had there been a trap, the splash of the pebble in the trap where the water-seal existed would have been heard. There was no splash.

The drain-layer still maintained that there was a trap, but that he had not put it in himself. He had seen the trap lying about a few days before, he said, and it wasn't there now, so the master drain-layer, who had been at work, must have put it in. The inspector sent for the master drain-layer, and when he appeared his subordinate admitted that there was no trap, and proceeded to get one and put it in the water-conductor.

In every building there is a main soil-pipe, technically known as the soil-pipe stack, extending from the drain beneath the cellar floor to the roof. The joints in this pipe are called "hubs," a hub being the large end of a pipe into which the next pipe-length fits. These joints are calked. In examining one of these large soil-pipes in a dwelling, the water-test was applied and no leak was discovered but in looking at the joints one of the inspectors saw what he believed to be "balsheo."

Instead of removing it himself he thought of a better way in which to show the plumber that his trick didn't work. He called the attention of the plumber to the joint, by saying:

"I think you'd better calk that a little more."

Handling the calking iron as gently as possible, the unhappy artisan began, but at the first tap the brittle, black cement gave way, and as the pipe was full of water, the plumber was treated to a shower-bath through the crack in the pipe, which the cement had concealed.

"In spite of the fact that this trick practically never gets by us," said Mr. Bemis, "the plumbers are continually trying it on. It isn't always their fault that a pipe is cracked, but that makes no difference. The pipe must be without the possibility of a leak anywhere or it is useless."

To discover the absence of a trap which cannot be seen demands a degree of expertness which none but specialists possess. A "discovery by ear" was made in a different way by one of the assistant-inspectors of Providence recently. He was examining the plumbing in one of the saloons of the city and was looking at the sink.

"Have you a trap in connection with that sink?" he asked the proprietor. He was assurred that it was properly trapped. He listened while the water flowed into the receptacle and out through the escape.

"There's no trap there," he announced. "Get one put in at once."

"But you haven't looked," expostulated the proprietor.

"I don't have to look," was the reply, "But just to satisfy you I'll show you that there is no trap." Whereupon he laid bare the piping arrangements of the sink and proved his statement. It was a simple matter to him for when he listened he heard the water running in the sewer and had there been a trap there would have been no such noise.

This same inspector unearthed a defect in a sewer-pipe joint. The pipe-layer seeing the place was defective, had hung at the unconnected spot a bag half-

filled with cement and on the cement had put water so that when the work was inspected the pipe would appear to have a proper flow of water.

This might have worked all right, but after the inspector had put his hand into the pipe and felt that water contained in the bag, he went to the other end of the long length of pipe and found that there was no water at all. Once more he examined the place where the bag hung, and, putting his hand in deeper struck the cement. Smiling kindly upon the discomfited drain-layer he suggested that the scheme, while ingenious, was not in line with sanitary plumbing and a change would have to be made.

Now and then soil or waste-pipe vents give trouble and one of the first inspections made by Mr. Bemis was of this sort. There were one or two attacks of diphtheria in a mansion on the east side of the city one summer and the family had taken fright and left the house. It was suspected that defective plumbing was the cause of the disease and in the early winter, in company with a master plumber, Mr. Bemis made an inspection.

When they entered the house they began by making a small fire in the furnace and on going upstairs and into the bathroom were surprised to see smoke pouring into the bath-tub through the opening which carries off the water when the plug is removed. Upon investigation Mr. Bemis found that the vent-pipe from all the bath-room fixtures was run through a chimney flue instead of through the roof. A cold chimney had made a back draft, the impure air was carried back into the rooms and the diphtheria germs had an excellent breeding place.

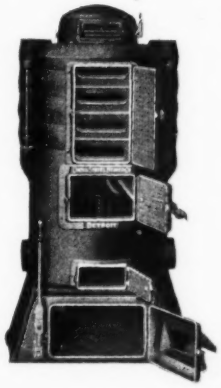
"It was a startling thing to find," commented the inspector, "and the result was that there was a complete overhauling of the plumbing and the work was tested. After that there was no further trouble."

THE THIRD "STANDARD" DINNER.

The Standard Manufacturing Company, 949 Penn Ave., Pittsburg, Pa., gave its third annual "Standard" dinner at the Fort Pitt hotel in that city on Wednesday evening, January 5th. In the morning of that day twenty-five of the men connected with the Standard Mfg. Co.'s store went down to the Standard plant where they enjoyed an excellent lunch after which they went on a tour of inspection and spent the entire afternoon in the plant. Returning from the plant the party went at once to the Fort Pitt hotel where an elaborate dinner was served at 7 p. m. Geo. W. Ryan, secretary and manager of the Standard Manufacturing Co. acted as toastmaster and contributed more than his share to the general enjoyment of the party. The speakers were W. A. Myler, secretary-treasurer; E. L. Dawes, manager of factories; and J. C. Reed, superintendent, all of the Standard Sanitary Mfg. Co. Mr. Myler spoke on "The Pittsburg Store"; Mr. Dawes on "Enameled Ware," while Mr. Reed spoke "From a Factory Viewpoint." The entire program was a great success including the instructive and entertaining tour of the Standard plant. The only thing that caused regret about the affair was the absence of Theodore Ahrens and F. J. Torrance, president and first vice-president, respectively, of the Standard Sanitary Mfg. Co., both of whom found it impossible to be in Pittsburg that day. Among those present were: W. A. Myler, E. L. Dawes, J. C. Reed, Geo. W. Ryan, H. L. Allison, J. D. Burgess, W. Doak, F. C. Domhoff, R. Donoghue, W. J. Frankston, J. F. Getty, P. Glacken, W. C. Goodman, F. S. Kaulback, H. H. Krey, D. Matthews, H. F. Mechling, J. McDonough, E. McMahon, H. McMahon, B. Reed, J. Schumacker, J. E. Tatem, R. C. Turner, W. N. Walcutt, E. J. Waldman and C. J. Wood. From every viewpoint the day seemed a red-letter day in the S. M. Co.'s history, and it was an ideal way of celebrating the entrance into the new year.

CAPITOL BOILERS AND RADIATORS

The Capitol Solar Burns Any Fuel



Any fuel can be used in Capitol Solar Boilers. Originally designed for hard coal, but used successfully with soft coal—any grade—coke, wood or gas. Fire-pot is large and deep enough to carry a deep fire for maximum length of time. The grates have air spaces suitable for the fine or largest coal and they rock and dump so as to allow minimum space between bars when tilted at any angle.

You cannot find a boiler better adapted for your residence work. 19 sizes—steam and hot water.

Catalogue and description on request.

United States Heater Company.

General Offices and Works: Fort St. and Campbell Ave., DETROIT, MICH.

BRANCHES:		SALES AGENCIES:	
NEW YORK	129 Worth St.	MINNEAPOLIS, MINN.,	Plumbing & S. F. Supplies Co.
CHICAGO	34 Dearborn St.	ST. LOUIS, MO.,	L. M. Rumsey Mfg. Co.
OMAHA	916 Farnam St.	DENVER, COLO.,	Kellogg & Stokes Stove Co.
DETROIT	139 Jefferson Ave.	DULUTH, MINN.,	Duluth Plumbing Supplies Co.
KANSAS CITY OFFICE	1020 Commerce Bldg.		

FRANK H. CULLEN RE-ENTERS PLUMBING SUPPLY TRADE.

Frank H. Cullen has entered the plumbing supply trade again and will hereafter do business as the Cullen Manufacturing & Supply Co., at 237-239 First Ave., Pittsburgh, Pa. Mr. Cullen was until recently connected with the Union Mfg. & Supply Co. in that city as its president, a position he had held since the company was established.

STERLING SANITARY MFG. CO. ITS NEW NAME.

The Union Manufacturing and Supply Co., 1207 Liberty Ave., Pittsburg, Pa., has changed its name and will hereafter be known as the Sterling Sanitary Manufacturing Co. The company plans a number of changes in its policy and will soon increase its selling force. The officers of the company are M. A. Sisk, president; W. Y. English, secretary, and Frank S. Cousley, treasurer.

HOLD ANNUAL MEETING AND ELECT OFFICERS.

The Kauffman Heating & Engineering Co., 2320 Olive St., St. Louis, Mo., held its annual meeting on Tuesday, January 4th, and elected the following officers for the ensuing year: Sam Kauffman, president; D. S. Edwards, vice-president; B. A. Shaw, secretary.

NOW IN ITS NEW PLANT.

The Manitowoc Brass and Foundry Company, Manitowoc, Wis., has completed its organization and is now engaged in the manufacture of brass goods. A factory building at York and Tenth street has been remodeled and equipped with new machinery. Those interested in the project are Abraham Schwartz, David Balkansky and Henry Stahl.

WISCONSIN.

Polacheck Bros., Milwaukee, Wis., have been awarded the government contract for furnishing the light fixtures in the public building at Cedar Rapids, Ia., at $2,298.

F. A. Goll, Milwaukee, Wis., has been awarded the contract for putting in the sewer and water service for a public drinking fountain at Eleventh avenue, Pearl and Bow streets. The fountain will be a gift to the city from R. D. Whitehead of the Badger State Humane Society.

The Covill Steam Purifier Co., Berlin, Wis., has been dissolved and stockholders have sold their interests to A. L. Covill, the organizer of the concern.

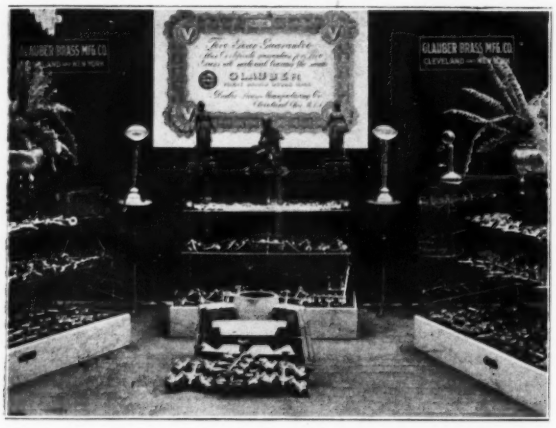
Plumbers in Milwaukee, Wis., have called attention to the fact that while St. Louis is the principal city in the United States to use lead and zinc, Milwaukee is the first to use zinc for brasses and plumbing manufactures. Wisconsin is the second zinc producing state in the union, being outranked by Missouri only.

The building at Sycamore and Second streets, Milwaukee, Wis., occupied by the Downey & Kruse Co., heating and ventilating contractors, Bayley Heating Co., and Northwestern Pattern Works, was almost totally destroyed by fire on Jan. 8. The losses are apportioned as follows: Downey & Kruse Co., $25,000; Bayley Heating Co., $20,000; Keelyn Electric Co., $15,000; Northwestern Pattern Works, $3,000. The losses were nearly covered by insurance in all cases. The Downey & Kruse Co. has already taken temporary quarters at 134 Sycamore street, opposite the burned plant, and despite the loss of its equipment and tools, is able to care for all contracts. The Bayley company has shown a like enterprise and spirit.

Thos. J. Sheehan, St. Louis, Mo., announces the removal of his plumbing establishment from 4253 Olive St. to 1710 on that street.

ATTRACTIVE DISPLAY OF PLUMBERS' BRASS GOODS.

The accompanying illustration shows the attractive display made by the Glauber Brass Mfg. Co., of Cleveland, Ohio, at the recent Industrial Exposition in that city. The most conspicuous feature was the large reproduction of the company's guaranty of the quality of the Glauber brass goods for plumbers. Ingots of copper and spelter,



An Attractive Display of Plumbers' Brass Goods.

with a crucible and some castings fresh from the foundry are shown in the foreground of the display. Another important part of the display is the showcases, which contain bath and basin cocks, supply and waste fixtures, stop cocks, bibbs and samples of the large line of plumbers' brass goods made by the company.

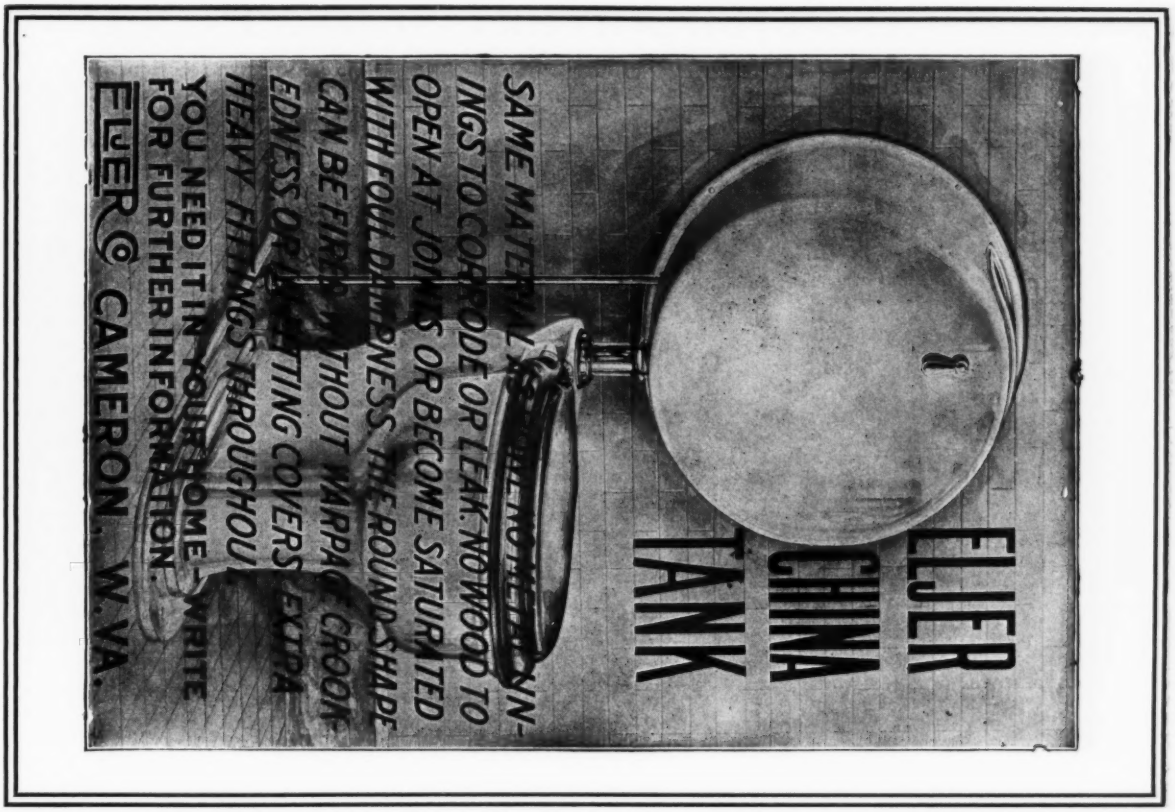
CALENDARS AND TRADE LITERATURE.

The M. J. O'Fallon Supply Co., 1621-1639 Fifteenth St., Denver, Colo., has issued a novel and attractive calendar for the new year, bearing excellent reproductions of photographs of the officers of the company and its place of business, a modern five-story brick building. The size of the calendar is 15x30 in., and it will no doubt prove a welcome ornament on the wall of many a plumber's office in the great Southwest.

The Southwest Plumbing Supply Co., Kansas City, Mo., sent its patrons and friends in the trade an excellent thermometer with the season's compliments, a most useful reminder of the company's good will.

In the new catalog of the Milwaukee Brass Mfg. Co., Milwaukee, Wis., 8 in. x 5½., 269 pages, cloth bound, the new list prices adopted by the National Association of Brass Manufacturers have been incorporated. The goods shown in the catalog are manufactured under the trade mark "Pressure Proved," and it is stated that each article and all the component parts of each article, are tested under a water pressure of 150 lb. The catalog shows a complete line of plumbers' brass goods.

The Fowler & Wolfe Mfg. Co., Philadelphia, Pa., is determined to keep itself in the minds of the trade by means of a most useful desk souvenir—a memorandum pad. It is tasteful in design and will fit a vest pocket nicely. We have not shown ours to anybody for fear we might lose all our notes. We imagine that an application might still be in time if some of our readers desired to test the truth of this paragraphic announcement of the excellence of the company's selection. When you write, mention "Domestic Engineering."


ELJER
CHINA
TANK
SAME MATERIAL
INGS TO CORRODE OR LEAK. NO WOOD TO
OPEN AT JOINTS OR BECOME SATURATED
WITH FOUL DAMPNESS. THE ROUND SHAPE
CAN BE FIRED WITHOUT WARPING OR CRACK-
EDNESS OR INJURY TO GLAZE. GETTING COVERS
HEAVY FITTINGS THROUGHOU
YOU NEED IT IN YOUR HOME—WRITE
FOR FURTHER INFORMATION.
ELJER CAMERON, W. VA.

PATENTS

944,250, Ventilator—Alfred M. Arnesen, Chicago, Ill.

944,255, Pressure-regulator—Clarence H. Bong, Chicago.

944,273, Expansion-joint for pipe-lines—Eugene F. Osborne, Chicago, Ill., assignor to Osborne Steam Engineering Company., Chicago, Ill., a corporation of Illinois.

944,286, Valve—Charles W. Sherburne, Boston, Mass.

944,295, Steam-trap—Cole Stickle, Indianapolis, Ind., assignor to the Open Coil Heater and Purifier Company, Indianapolis, Ind., a corporation.

944,311, Drain-pipe cleaner—George M. Bloom, Detroit, Mich.

944,338, Air-valve for radiators—Fred W. Leuthesser, Chicago, Ill., assignor to Monash-Younker Company, Chicago, Ill., a corporation of Illinois.

944,395, Water percolator—Guido J. Wiggenhorn, Los Angeles, Cal.

944,402, Non-return valve—Edward V. Anderson, Monessen, Pa., assignor, by direct and mesne assignments, to Golden-Anderson Valve Specialty Company, Pittsburg, Pa., a corporation of Pennsylvania.

944,450, Radiator—Leon Loziano, Paris, France, assignor to La Societe Loziano & Finet, Paris, France.

944,425, Pump—Anthony A. Ficener, Mansfield, O., assignor to Barnes Manufacturing Company, Mansfield, O., a corporation of Ohio.

944,457, Compression-bib—John N. Mortimer and Emile L. Strauss, Cleveland, O., assignors to the Central Brass Manufacturing Company, Cleveland, O., a corporation of Ohio.

944,447, Valve-operating float—William Briggs, Brooklyn, N. Y.

944,627, Water-closet outlet connection—Charles H. Moore, New York, N. Y.

944,686, Automatic gas-regulator—George H. Murray, Bristol, Vt.

944,710, Pipe-cleaning device—George F. Whitney, East Orange, N. J., assignor, by mesne assignments, to National Water Main Cleaning Company, New York, N. Y., a corporation of Maine.

944,759, Hot-water and steam boiler—Harry L. Worden and Henry O. Wurmser, Lorain, O.

944,816, Automatic drainage-valve—Cassius C. Peck, Rochester, N. Y.

944,871, Valve—William J. James, Pittsburg, Pa.

Burlington, Iowa.—The Russell Sewage Disposal Company, of this city, sold to the Ott Hardware Co., of Santa Barbara, Cal., a sewage disposal system for Admiral McCalla, of Santa Barbara, Cal.—Adv.

The Hughson Steam Specialty Co., 742-3 First National Bank Bldg., Chicago, Ill., has issued a 44-page catalog of the "Eclipse" steam specialties, which are very well known in the market, having for many years been advertised by the John Davis Co. George H. Hughson, the president of the Hughson Steam Specialty Co., was formerly connected with the John Davis Co. for 20 years, and upon the retirement of that company, as he and the superintendent were the designers and owners of the patents, the present company was formed for the exclusive manufacture of steam specialties.

CLASSIFIED ADVERTISEMENTS

Help Wanted

Salesman Wanted

Boiler salesman with established trade. Address No. 193, "Domestic Engineering," 325 Dearborn St., Chicago.

Competent salesman thoroughly posted on heating and power supplies to canvass the factory and mill trade in a large city. Address with full particulars, etc., No. 200, "Domestic Engineering," 323-325 Dearborn St., Chicago.

A large boiler and radiator manufacturer desires a salesman in the south and southwestern territory to sell their product as a side line on commission. Address No. 198, "Domestic Engineering," 325 Dearborn St., Chicago.

Familiar with general line of plumbing and heating goods, to travel in southern Michigan, northern Indiana and northwestern Ohio. State fully experience, amount of annual sales and salary expected. Address No. 199, "Domestic Engineering," 323-325 Dearborn St., Chicago.

Two experienced traveling salesmen who have some knowledge of plumbing and heating; persons acquainted with the trade. We manufacture an exclusive specialty line; no competition. State experience, references and salary desired. Address No. 196, "Domestic Engineering," 325 Dearborn St., Chicago.

Wanted.

Reliable man for first class steamfitting contracting business; must be capable and ready to invest $2,500 in the business. An exceptional opportunity for the right man. Address No. 191, "Domestic Engineering," 325 Dearborn St., Chicago.

A western jobber who is about to publish a fixture catalog would like to get in touch with five or six jobbers of plumbing supplies with view of dividing the expense of compiling. Address No. 195, "Domestic Engineering," 325 Dearborn St., Chicago.

Journeymen Wanted.

Sober, ambitious journeymen, competent to earn $4.50 per 8 hour day; steady work for the right men; no applications considered without references; transportation will be refunded to applicants accepted. J. M. Robb, 602 Y. M. C. A. Building, Peoria, Ill.

Plumbing Schools.

Learn plumbing on new buildings in four months. Tools furnished. Master Plumbers' Trade School, 3659 Finney Ave., St. Louis, Mo.

Situations Wanted

Positions Wanted.

Position with manufacturing company, by the manager of a large plumbing and heating establishment. Twenty-five years' experience with all grades of work; practical knowledge in all lines; extensive acquaintance among the trade; do not correspond unless you mean business and have a position which requires the services of a high-grade man. Boston preferred. Address No. 197, "Domestic Engineering," 325 Dearborn St., Chicago.

PERSONAL.

If Owen E. Newlon, plumber and electrician, will correspond with the Newlon Foundry & Machine Co., Grafton, W. Va., he will learn something to his interest. Any information furnished by any one regarding the whereabouts of said Owen E. Newlon will be thankfully received.

Books

Notes on Heating and Ventilation. Second edition. By Prof. John R. Allen. Written primarily for the steamfitter and designer of heating systems. Reduced to as brief a form as possible, so that readers can readily find notes or data desired. Bound in cloth, 6¾x4¾ inches; 272 pp.; postpaid, $2.00. "Domestic Engineering," Chicago.

Plumbing Catechism. By Charles B. Ball. Second edition. This book formulates, in question and answer form, the basic principles of plumbing design and practice. It is therefore especially commended to students in engineering and trade schools, and to master and journeymen plumbers, preparing for examinations. Bound in cloth; 6¾x4¾ inches; 100 pp.; postpaid, $1.00. "Domestic Engineering," Chicago.

Tables for Calculating Sizes of Steam Pipes. By Isaac Chaimovitsch. These tables furnish a method of determining sizes of steam pipes for low pressure heating without laborious methematical calculations; bound in cloth; 4½x6⅞ in.; 47 pp.; postpaid, $2.00. "Domestic Engineering," Chicago.

Roughing-in House Drains. Edited by Jno. K. Allen. A complete guide to the work of roughing-in plumbing, from the digging of the sewer to the finishing length of the soil and vent stacks, giving each step to be taken and telling how and why it is done. 6¼x4¼ inches; 134 pp.; bound in boards. Postpaid, 50 cents. "Domestic Engineering," Chicago.

Swimming Pools. By Jno. K. Allen. Their construction; cold and hot water supply; various methods of heating the water; directions as to selecting correct sizes of heaters. A practical guide to the subject. Over thirty illustrations; 6½x4¾ inches. Postpaid, 50 cents. "Domestic Engineering," Chicago.

Dean's Steamfitter's Computation Book. Contains figured cubical contents of rooms of different sizes and ceiling heights; also tables showing radiation necessary at various rates per square foot of glass surface, wall surface, or cubic feet; also square feet of glass or wall in surfaces of various dimensions; also cost of selling price of radiators at various market prices. These tables save fitters thousands of arithmetical calculations, giving the answers ready to hand. Leather bound; 7¾x5 inches; 90 pp.; postage prepaid, $2.50. "Domestic Engineering," Chicago.

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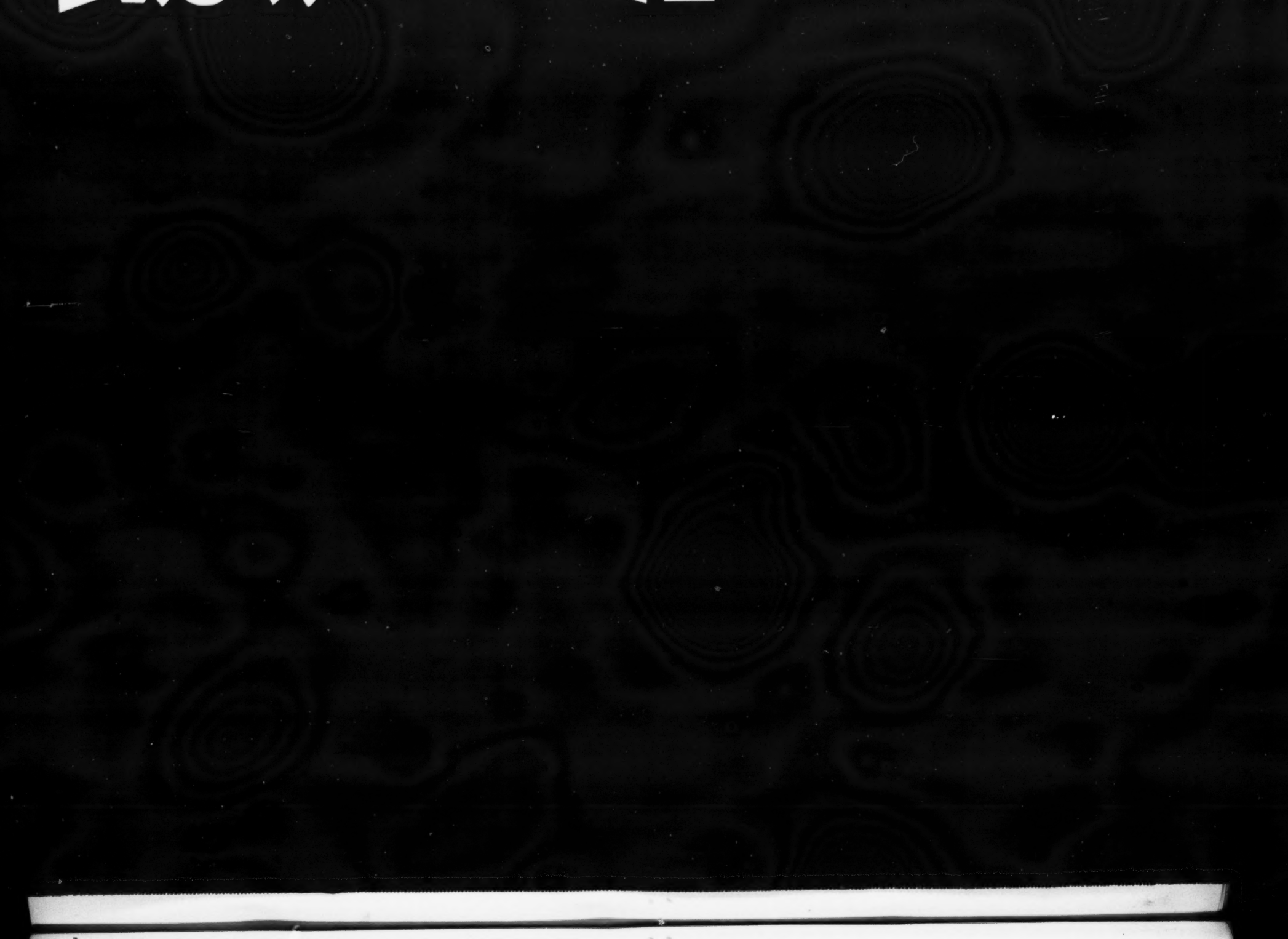
Patent Dec. 8, 1908 Sold by Jobbers